Scientific writing skill

Marta Ferreiro González
Victoria Mánuel Delgado

University of Cádiz

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Index

- Getting started at the lab: **Literature searches**
- **Experimental work**: The day a day protocol
- Obtaining and gathering results:
  Writing a scientific paper
- **Make your scientific work visible:**
  Poster elaboration

Literature searches

Literature searches

When starting a research work, the first thing to do is…

literature searching

Data bases for scientific bibliography (UCA source):

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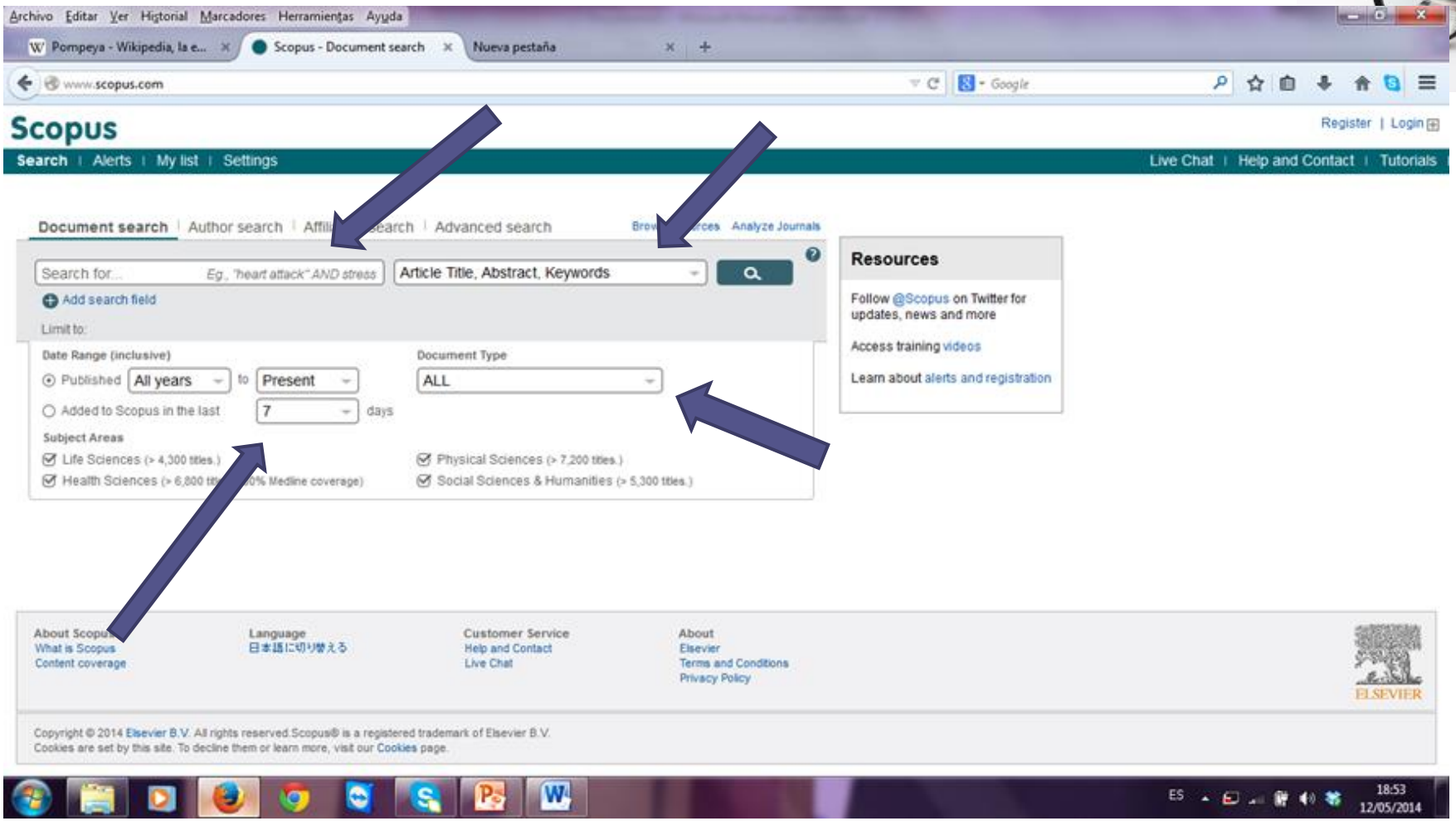

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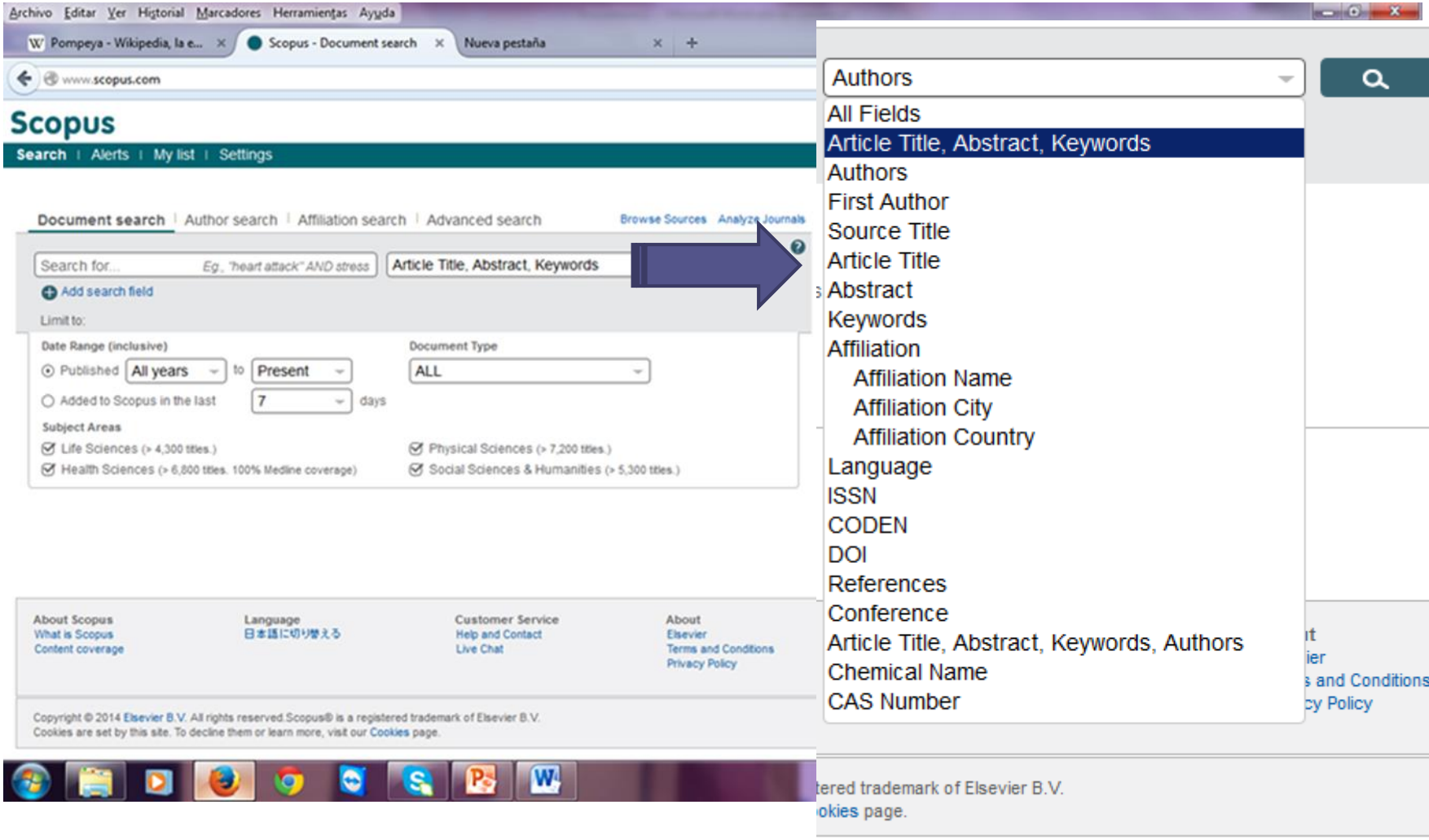

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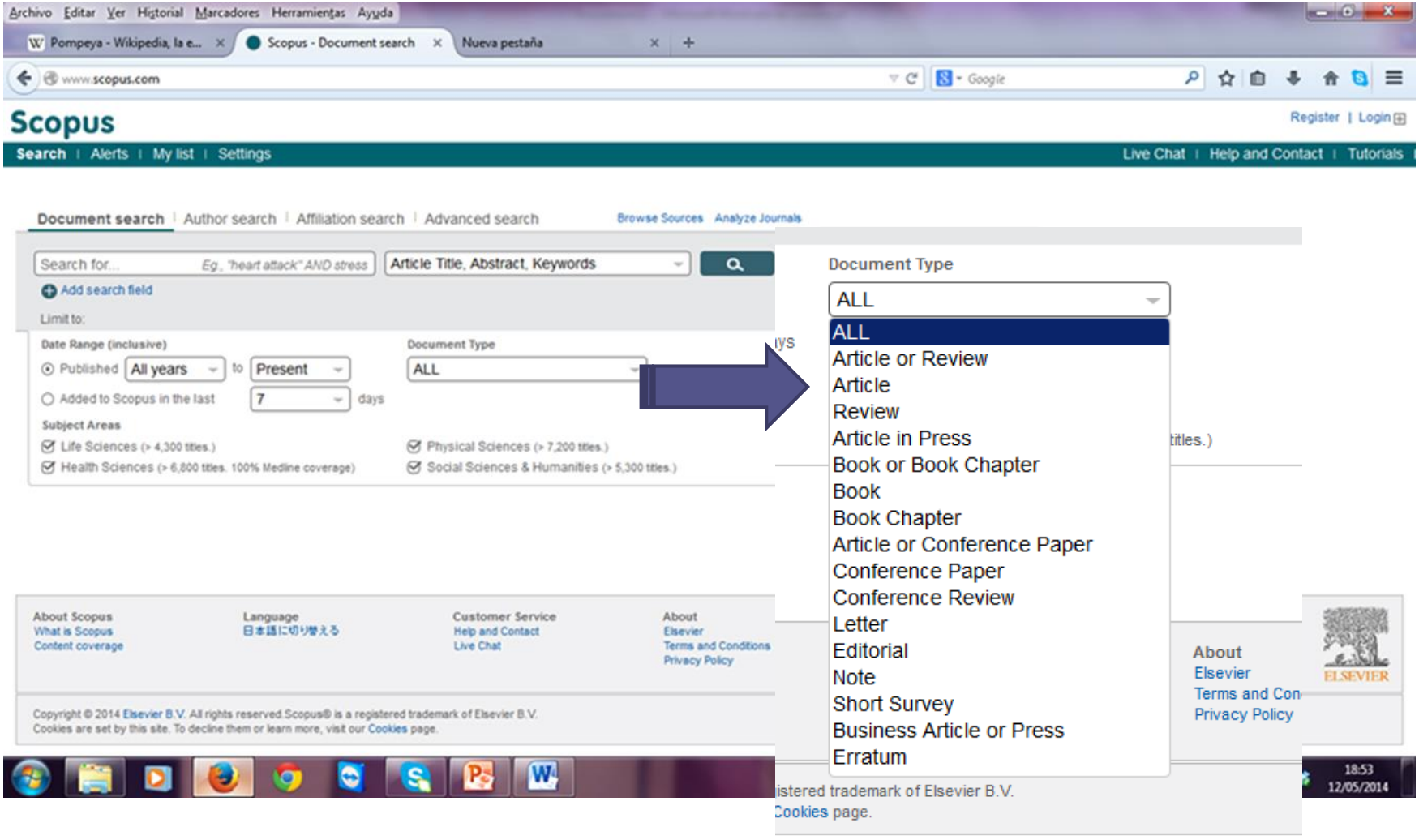

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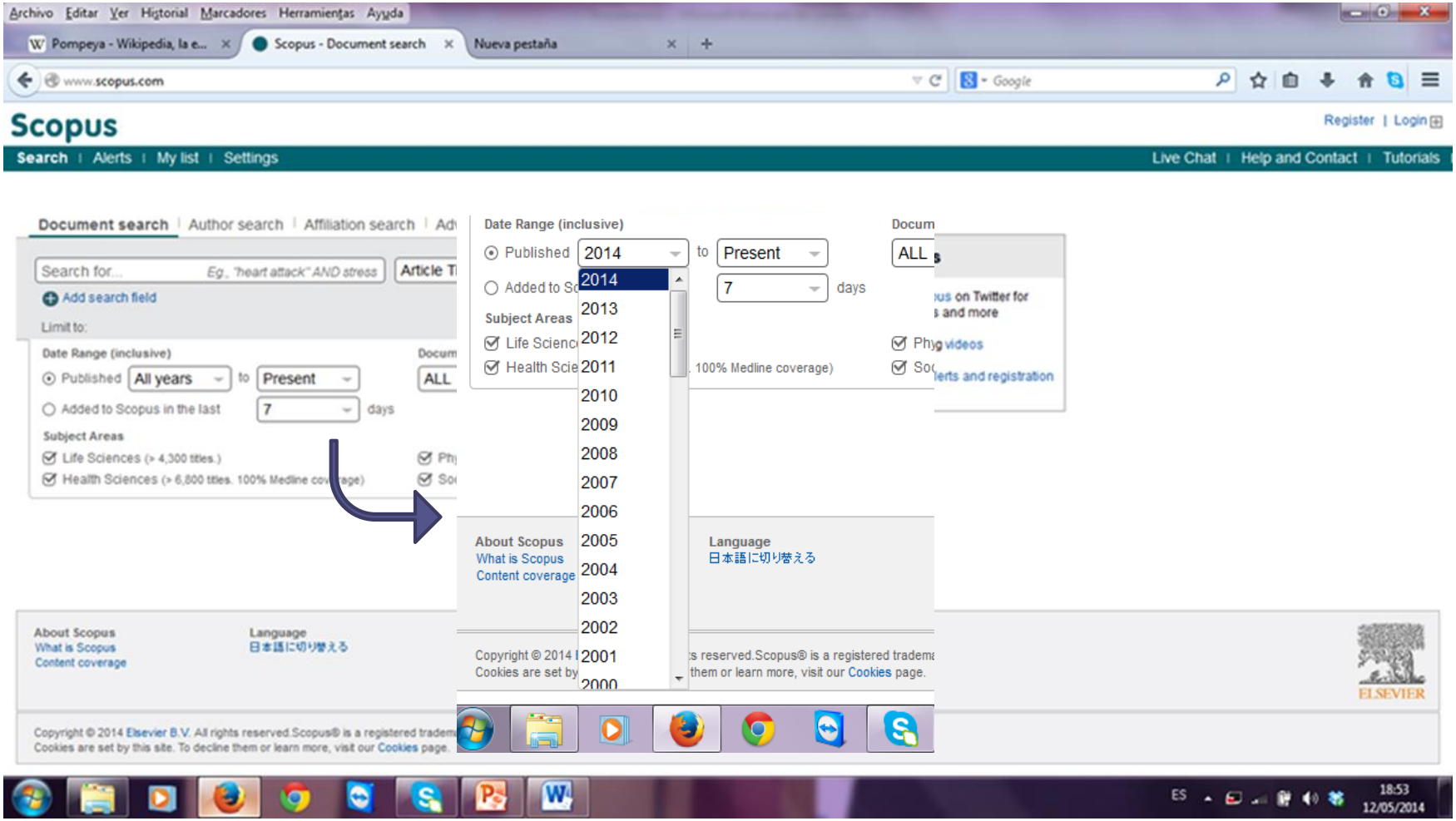

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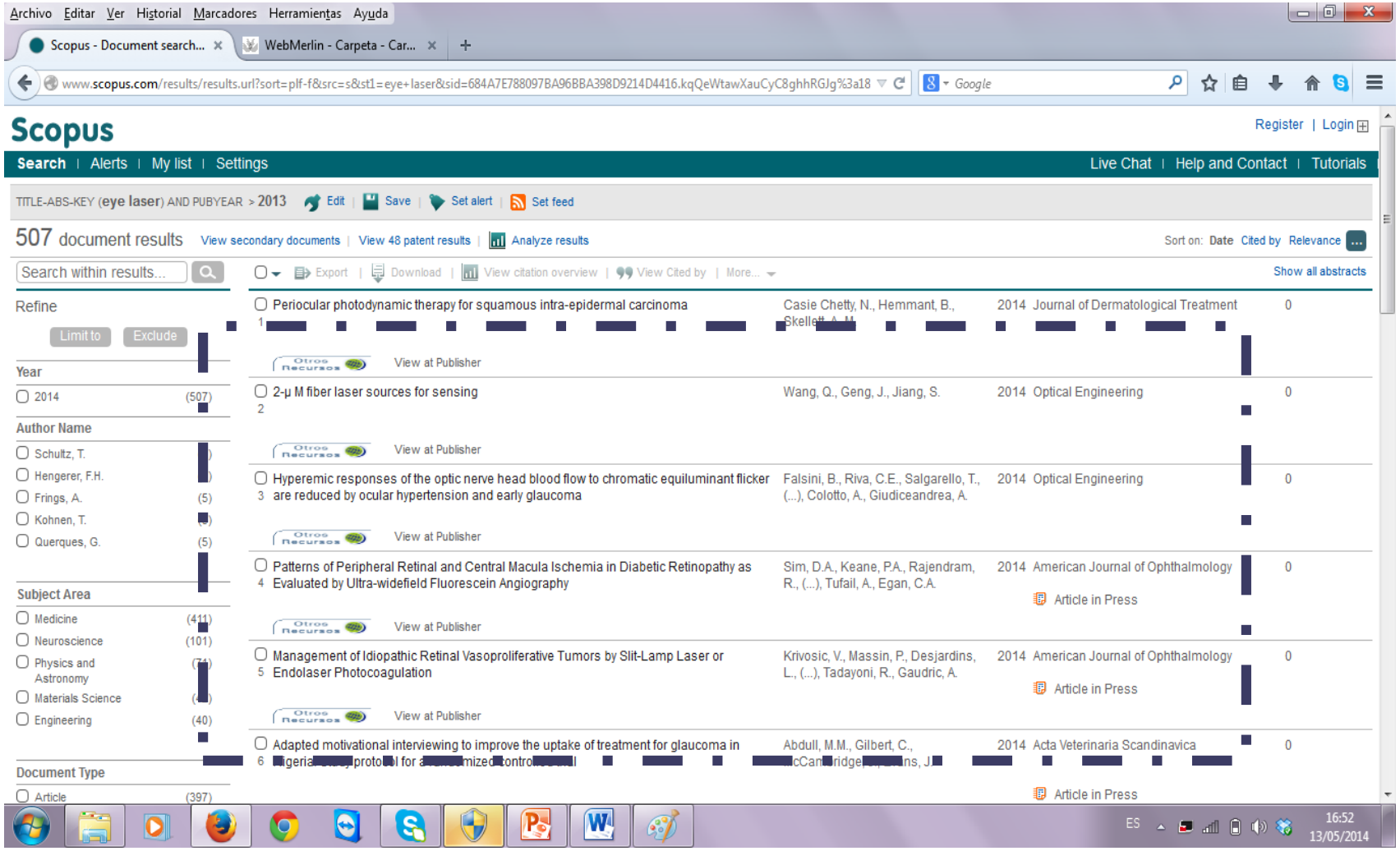

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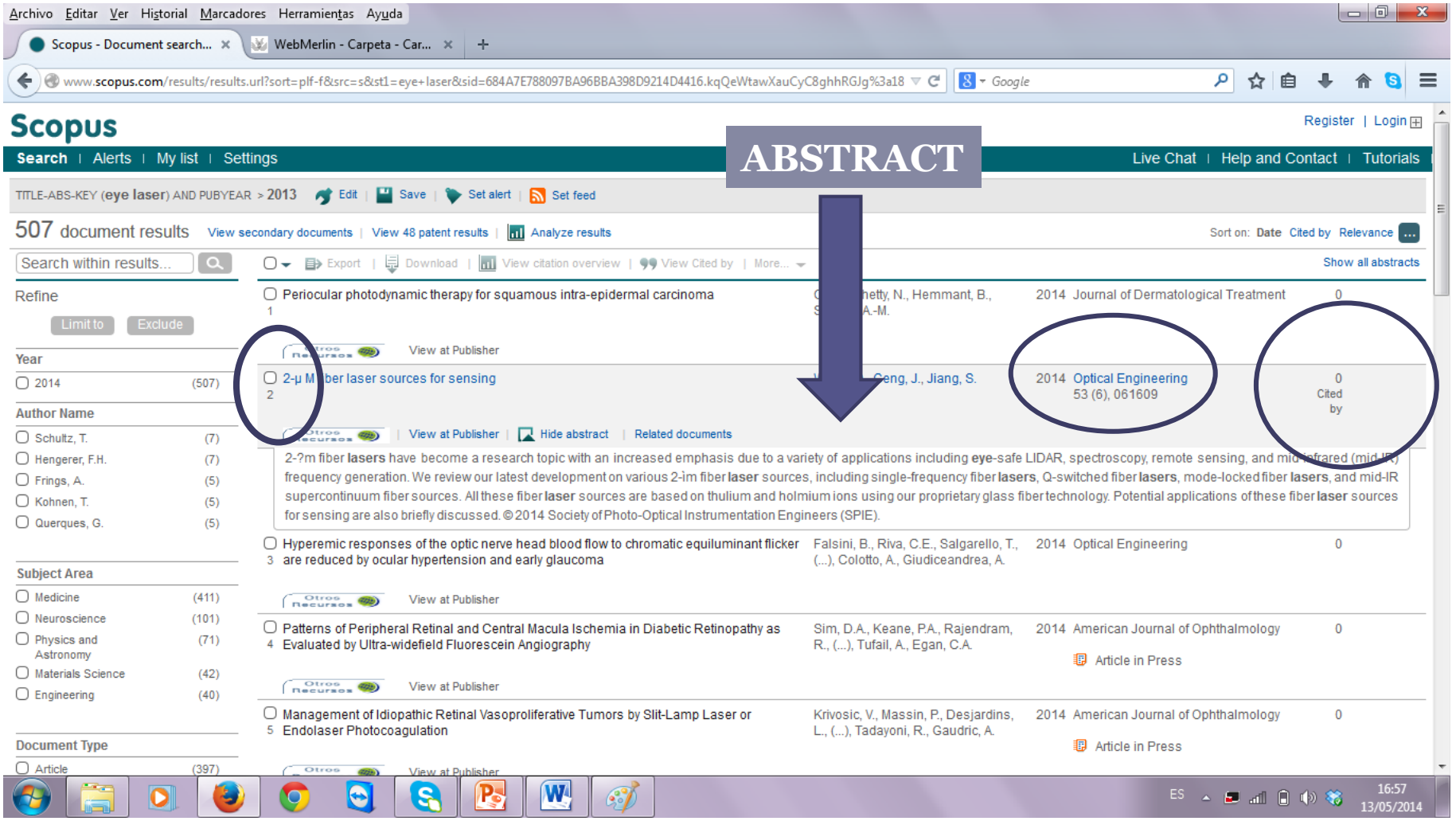

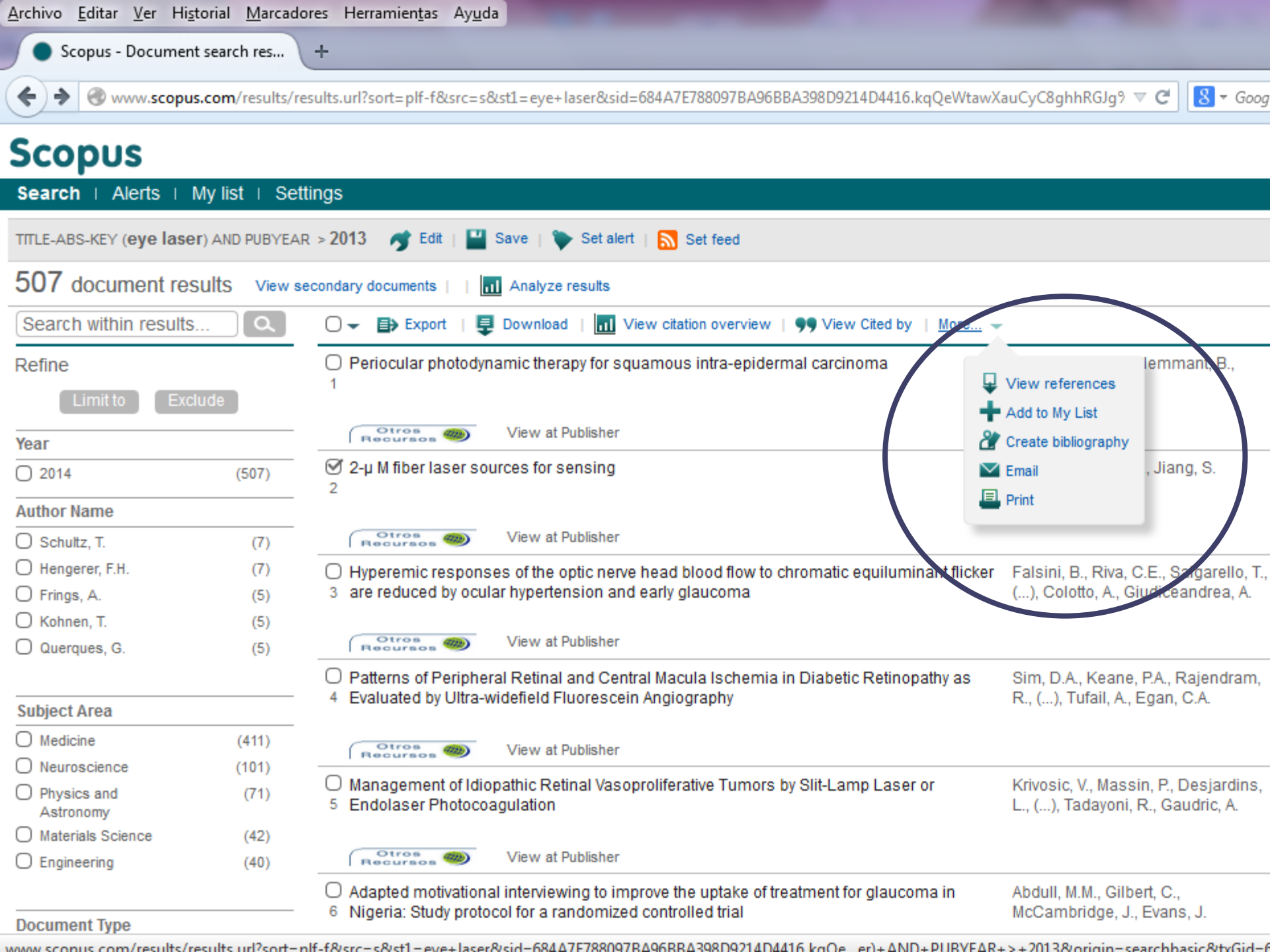
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Volume 53, Issue 6, 1 June 2014, Article number 061609

2-μ M fiber laser sources for sensing

Wang, Q., Geng, J., Jiang, S.

AdValue Photonics Inc., 3708 E. Columbia Street, Tucson, Arizona 85714, United States

Abstract

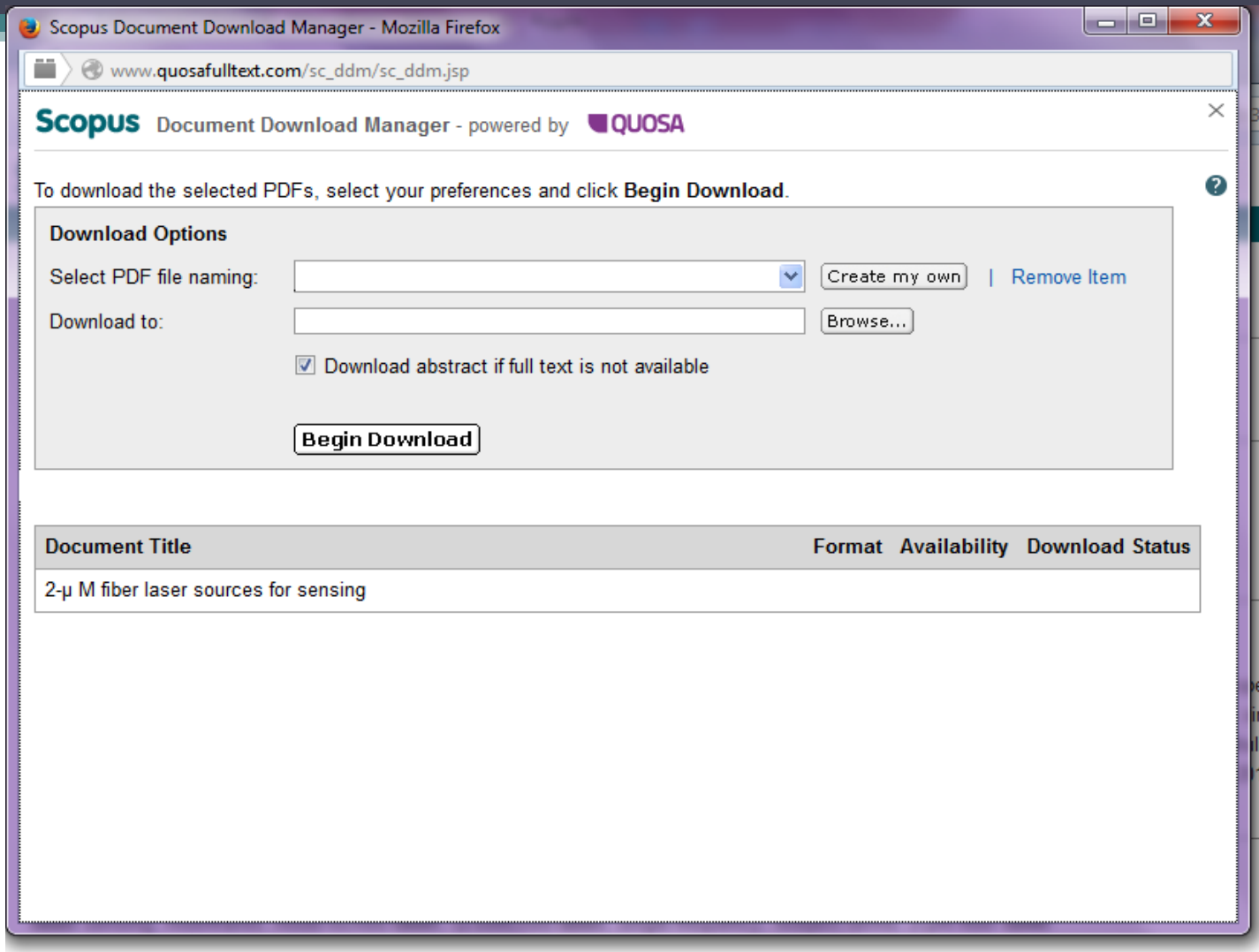
2-μm fiber **lasers** have become a research topic with an increased emphasis due to a variety of applications including **eye**-safe LIDAR, spectroscopy, remote sens and mid-infrared (mid-IR) frequency generation. We review our latest development on various 2-ìm fiber **laser** sources, including single-frequency fiber **las** Q-switched fiber **lasers**, mode-locked fiber **lasers**, and mid-IR supercontinuum fiber sources. All these fiber **laser** sources are based on thulium and holmium ions u our proprietary glass fiber technology. Potential applications of these fiber **laser** sources for sensing are also briefly discussed. © 2014 Society of Photo-Op Instrumentation Engineers (SPIE).

Author keywords

laser sensing; midinfrared; mode-locked **laser**; Q-switched **laser**; single frequency; Subject terms: 2-μm fiber **laser**

Indexed keywords

Frequency generation; Glass fiber technology; **Laser** sensing; **Lasers** , Q-switched; Mid infrared (mid IR); Midinfrared; Mode-locked **laser**; Single frequency



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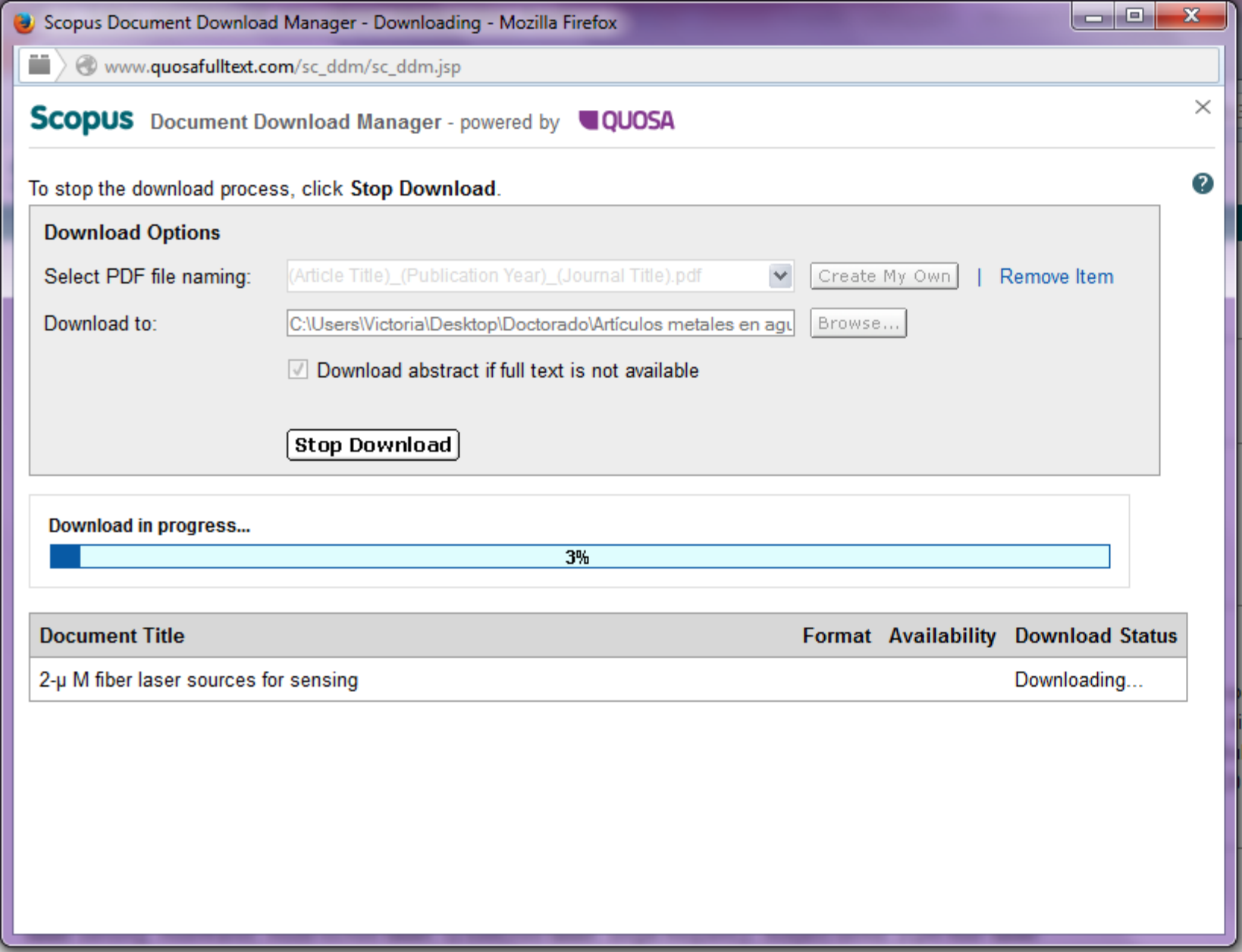

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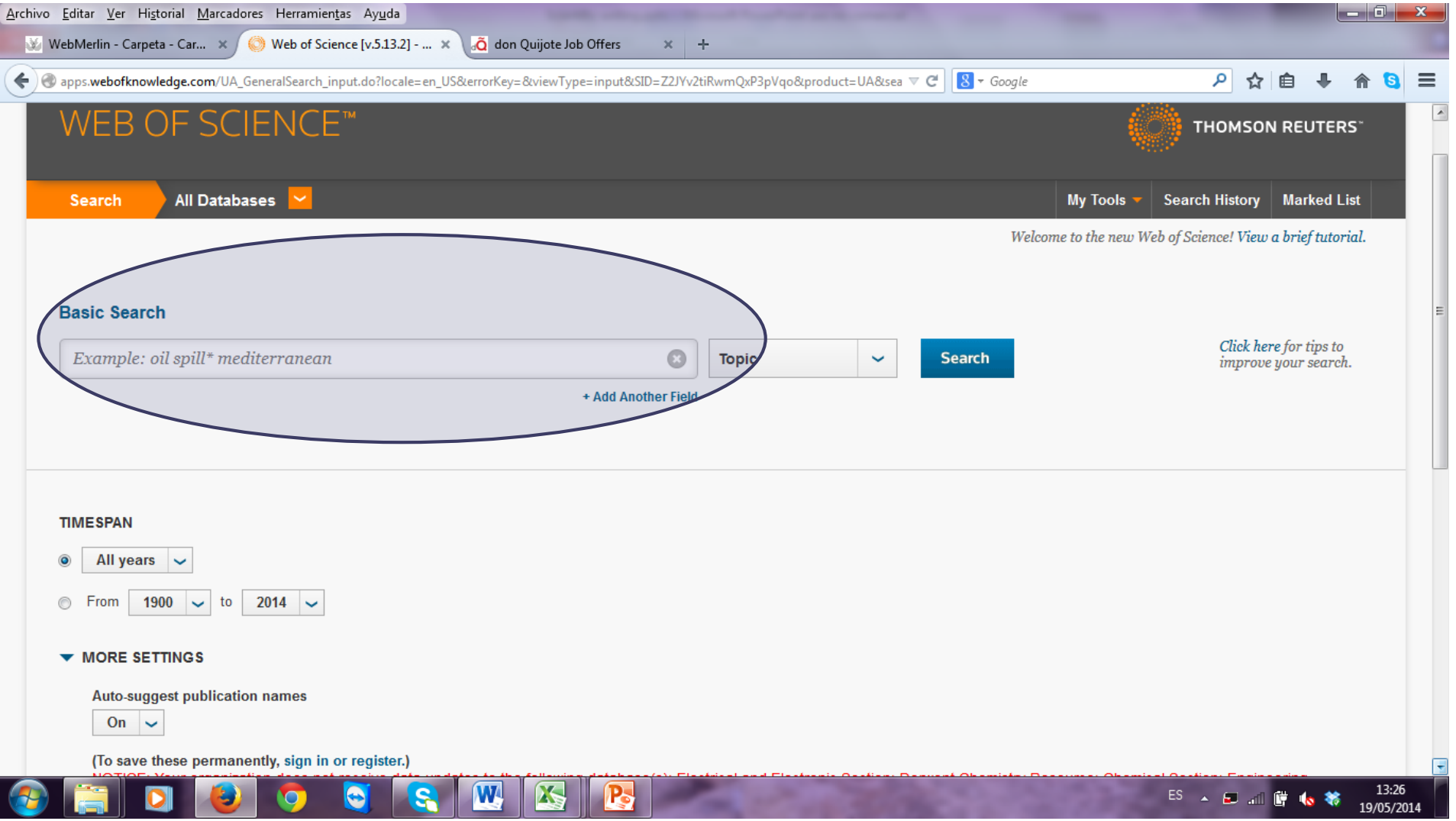

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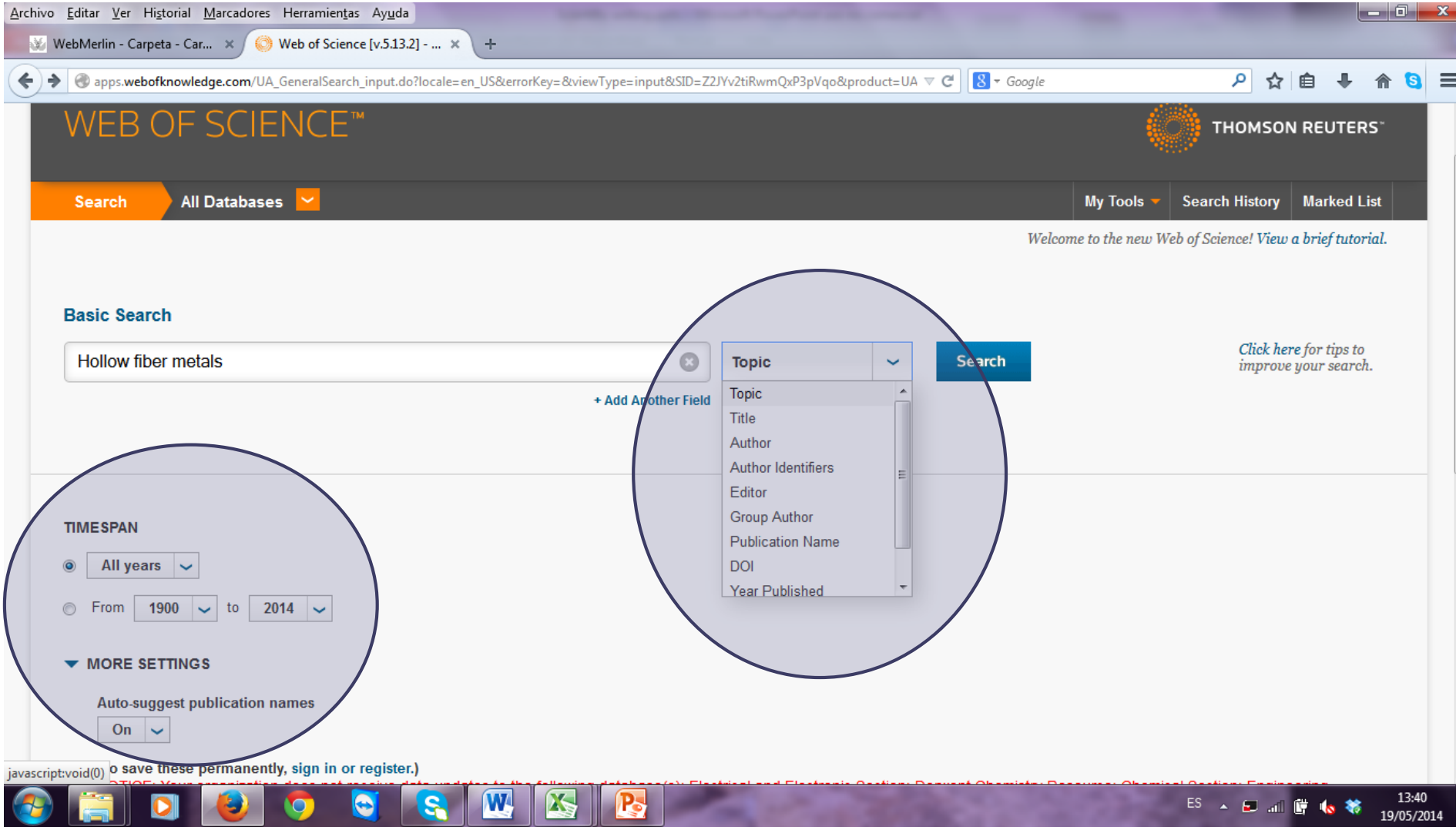

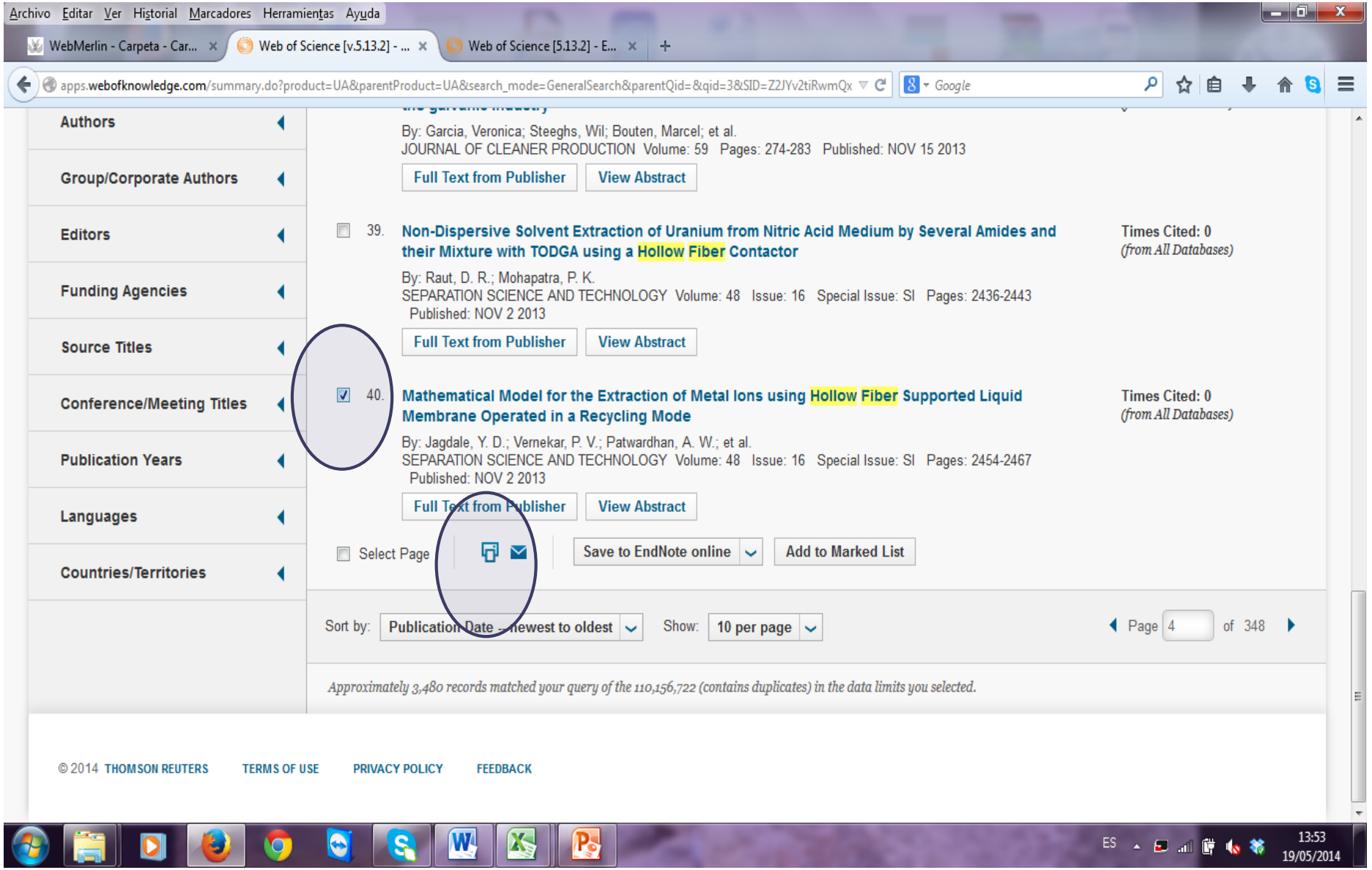
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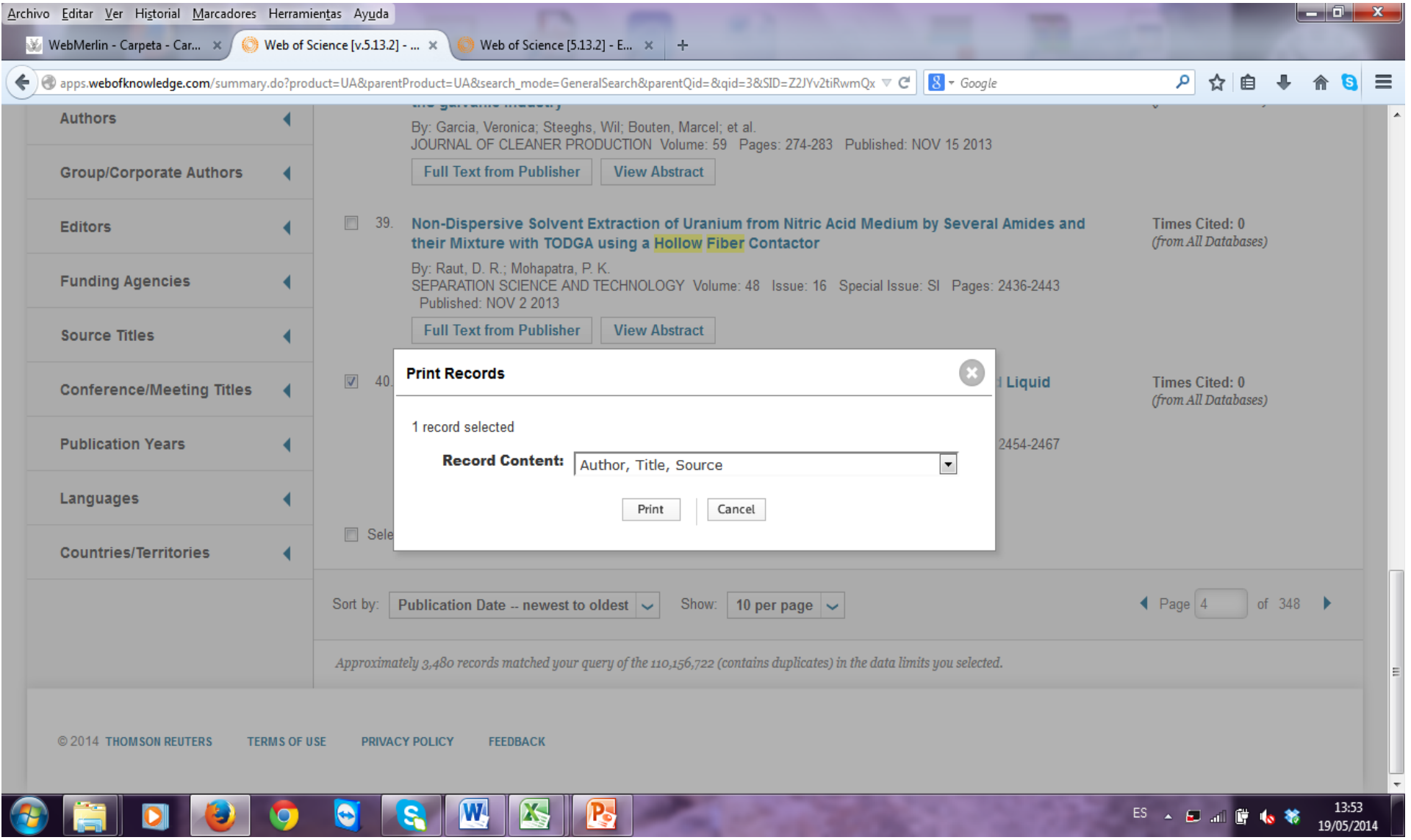
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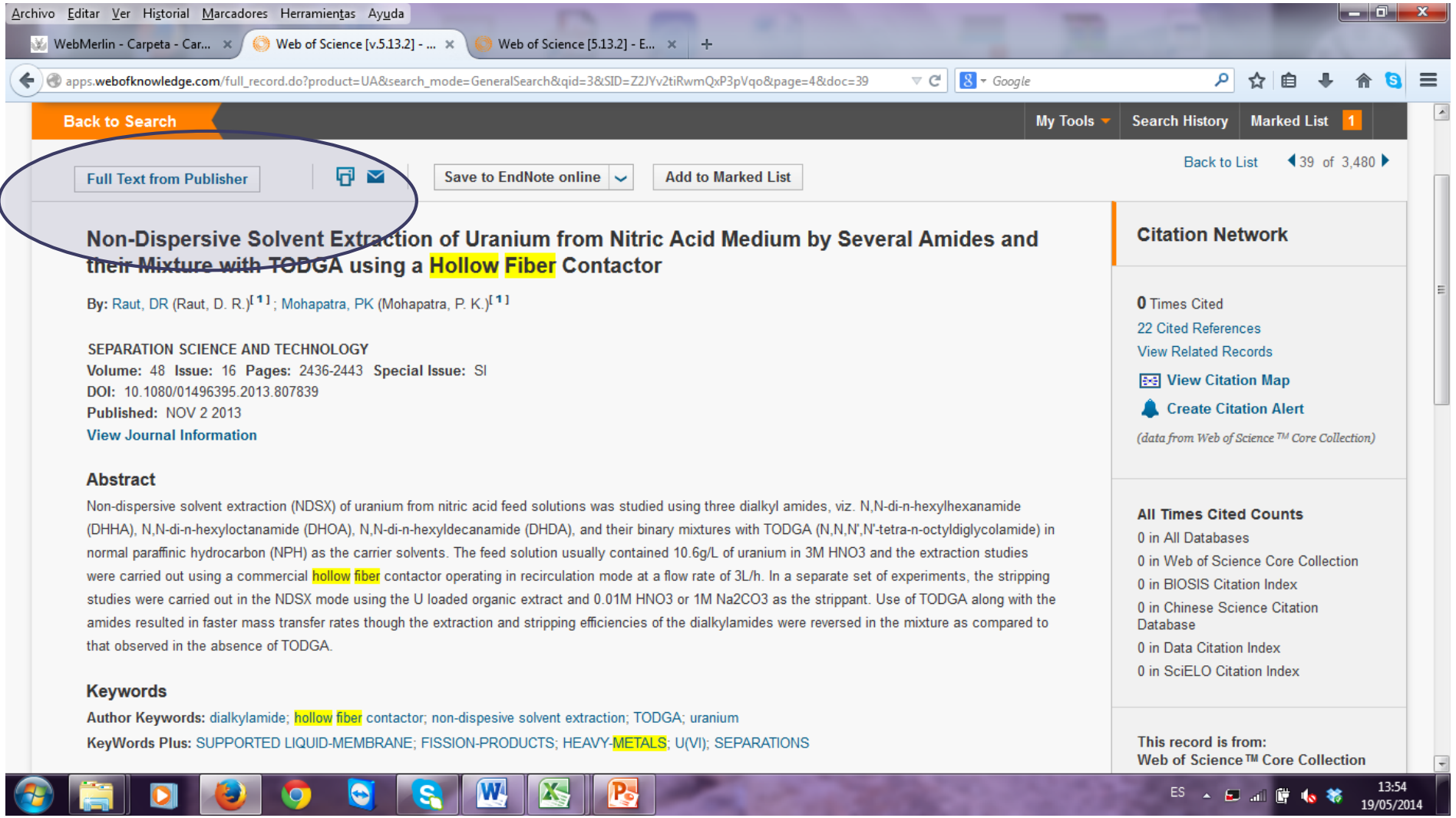
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By: Raut, DR (Raut, D. R.)[1]; Mohapatra, PK (Mohapatra, P. K.)[1]
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Volume: 48 Issue: 16 Pages: 2436-2443 Special Issue: SI
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Abstract
Non-dispersive solvent extraction (NDSX) of uranium from nitric acid feed solutions was studied using three dialkyl amides, viz. N,N-di-n-hexylhexanamide (DHHA), N,N-di-n-hexyloctanamide (DHOA), N,N-di-n-hexyldecanamide (DHDA), and their binary mixtures with TODGA (N,N,N',N'-tetra-n-octyldiglycolamide) in normal paraffinic hydrocarbon (NPH) as the carrier solvents. The feed solution usually contained 10.6g/L of uranium in 3M HNO3 and the extraction studies were carried out using a commercial hollow fiber contactor operating in recirculation mode at a flow rate of 3L/h. In a separate set of experiments, the stripping studies were carried out in the NDSX mode using the U loaded organic extract and 0.01M HNO3 or 1M Na2CO3 as the strippant. Use of TODGA along with the amides resulted in faster mass transfer rates though the extraction and stripping efficiencies of the dialkylamides were reversed in the mixture as compared to that observed in the absence of TODGA.
Keywords
Author Keywords: dialkylamide; hollow fiber contactor; non-dispesive solvent extraction; TODGA; uranium
KeyWords Plus: SUPPORTED LIQUID-MEMBRANE; FISSION-PRODUCTS; HEAVY-METALS; U(VI); SEPARATIONS
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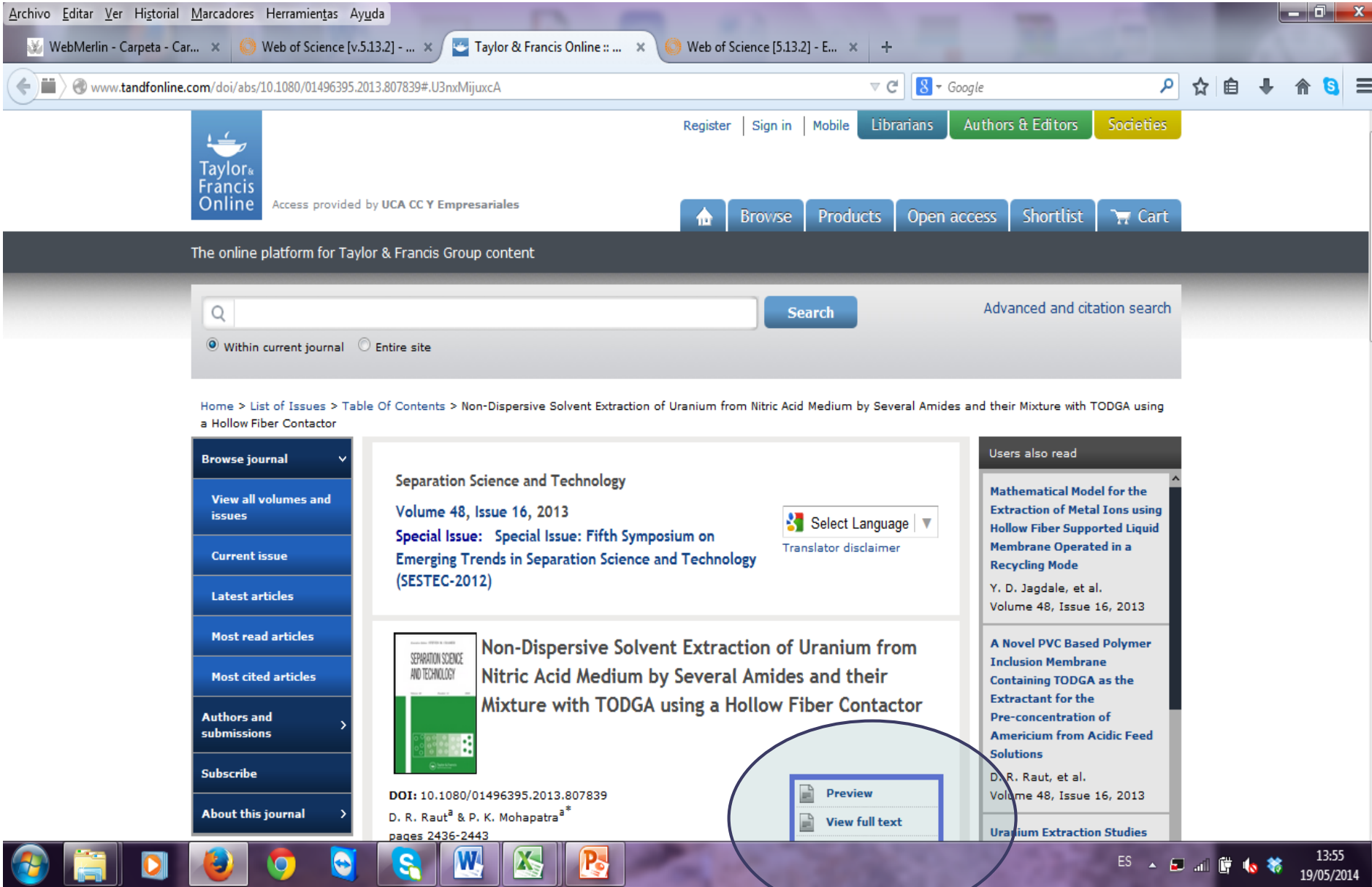
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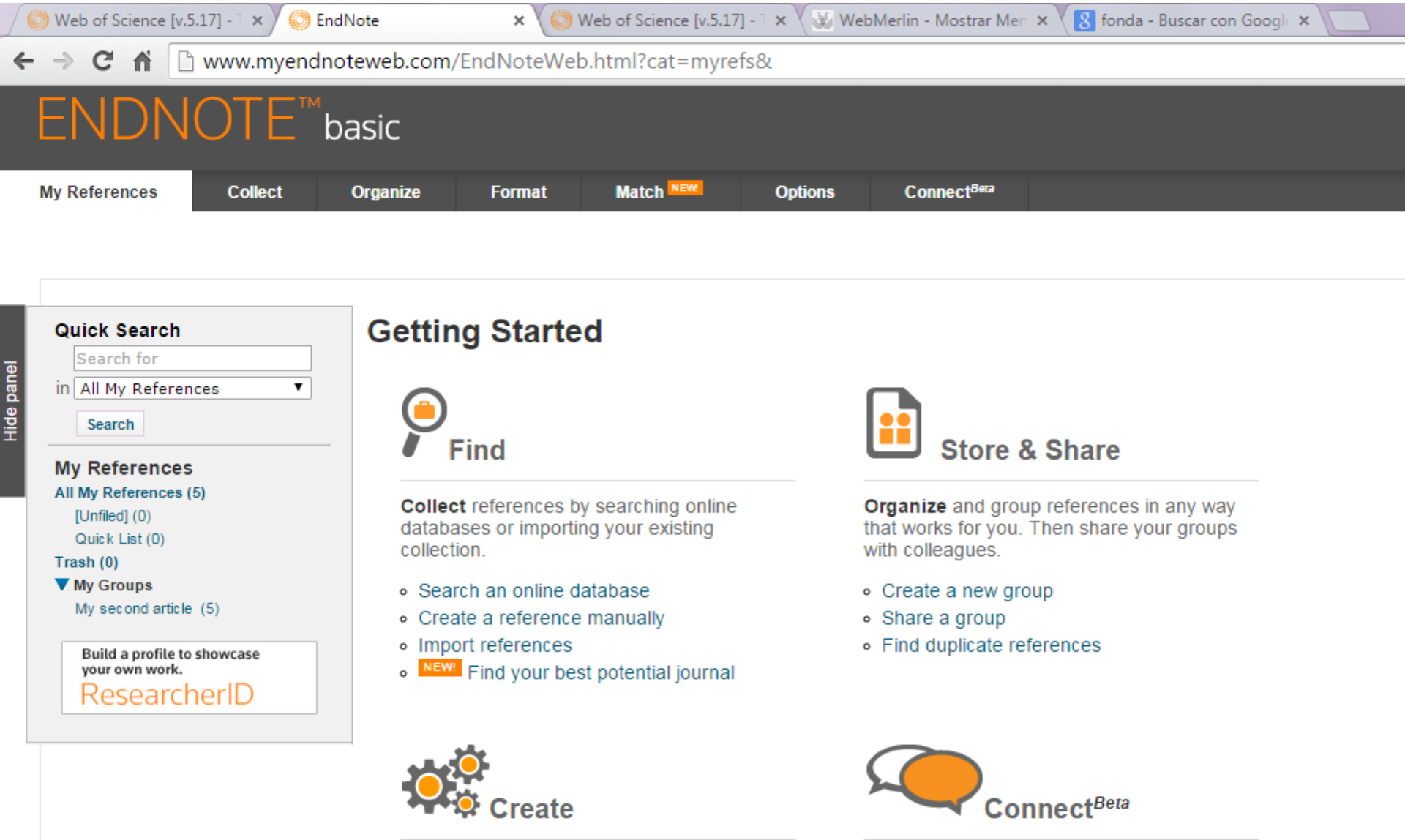

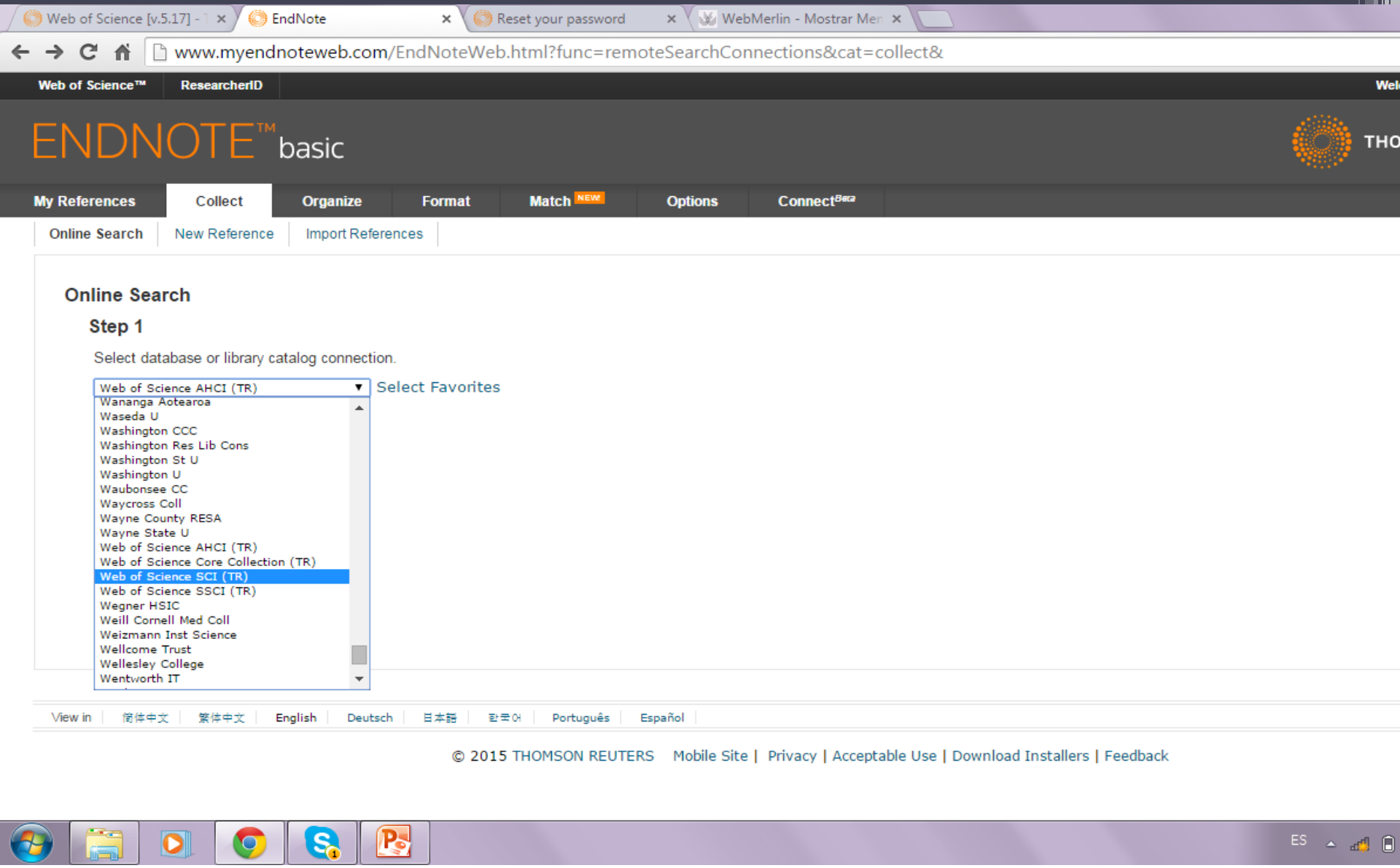

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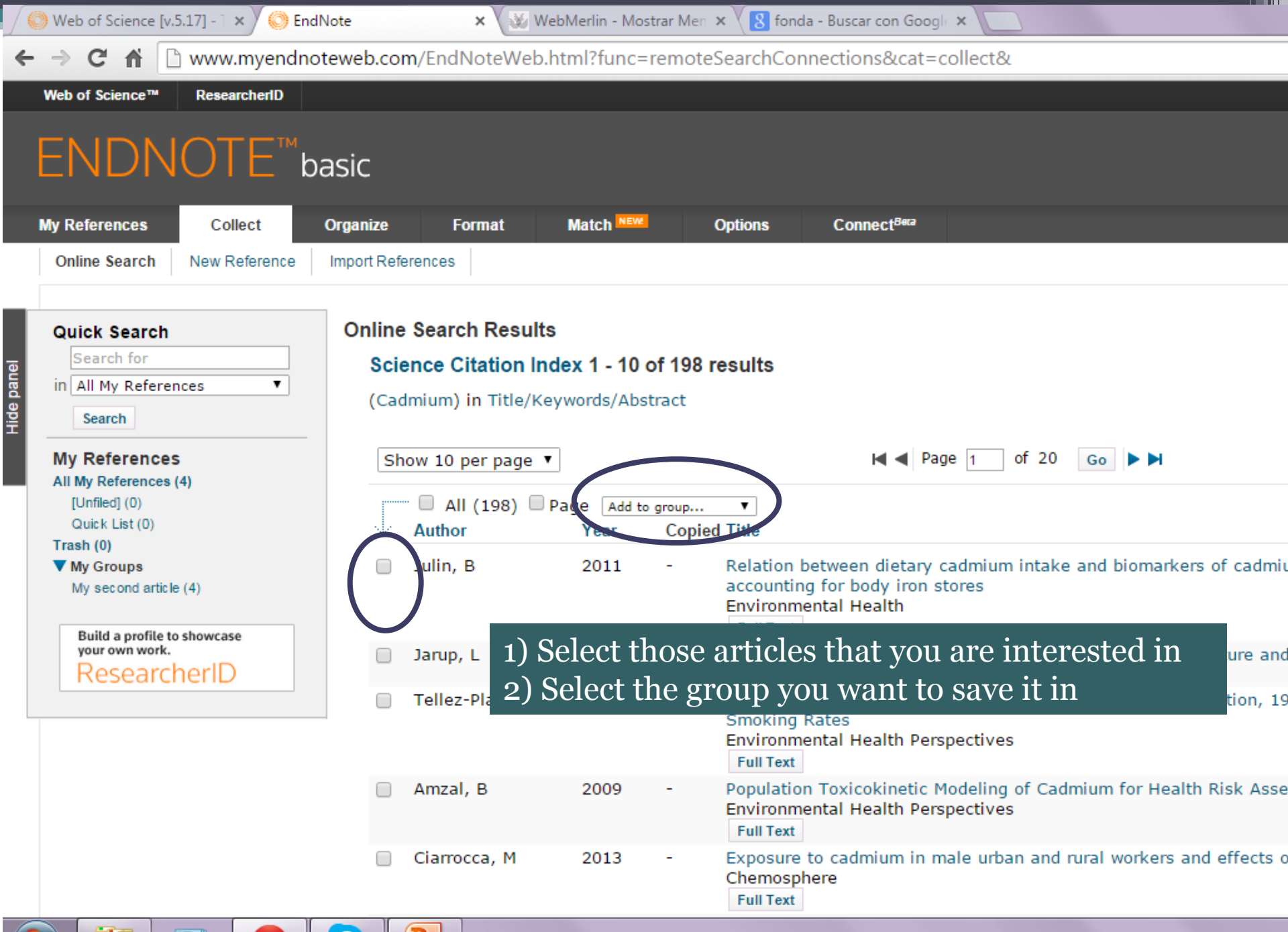
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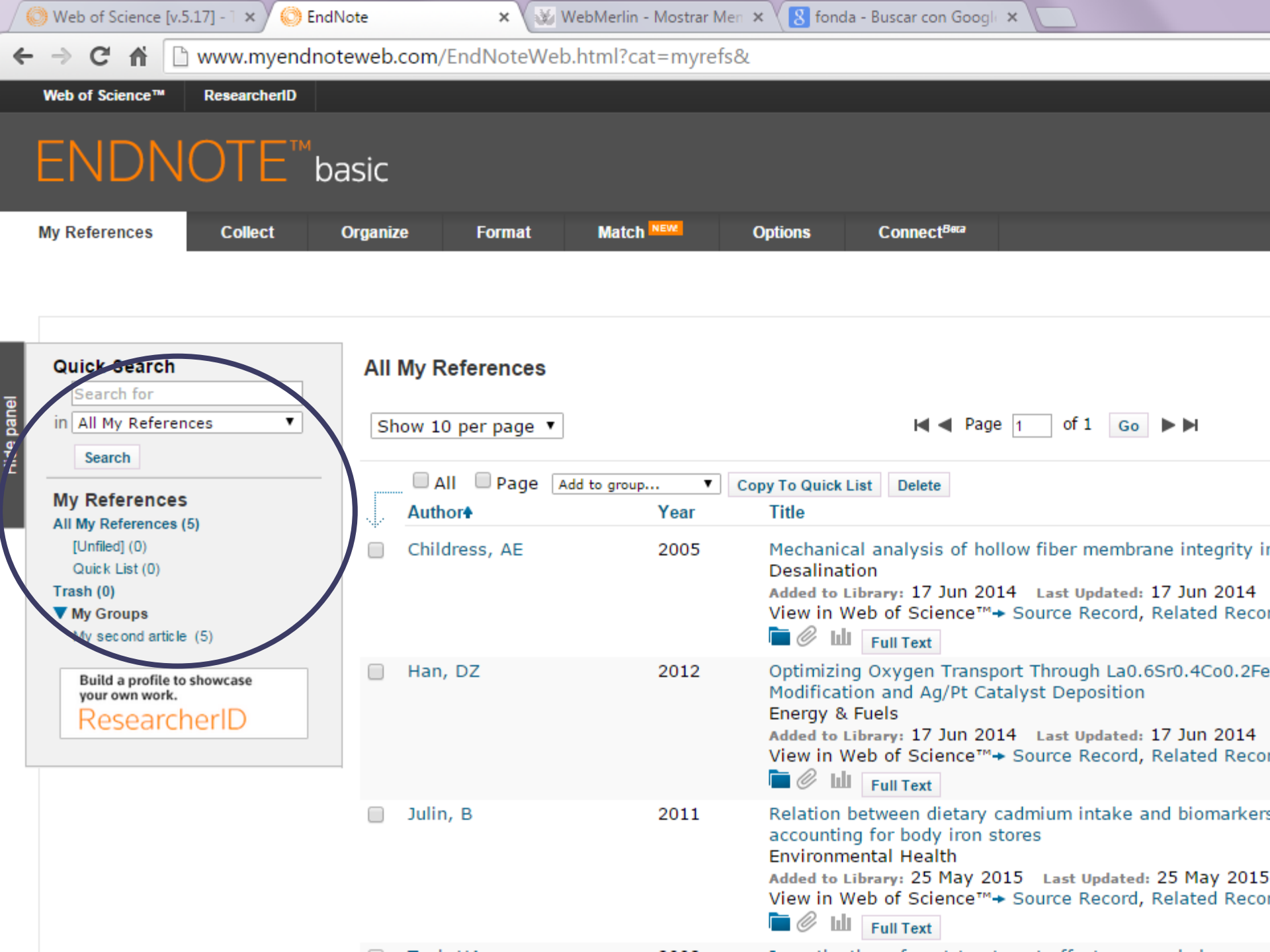
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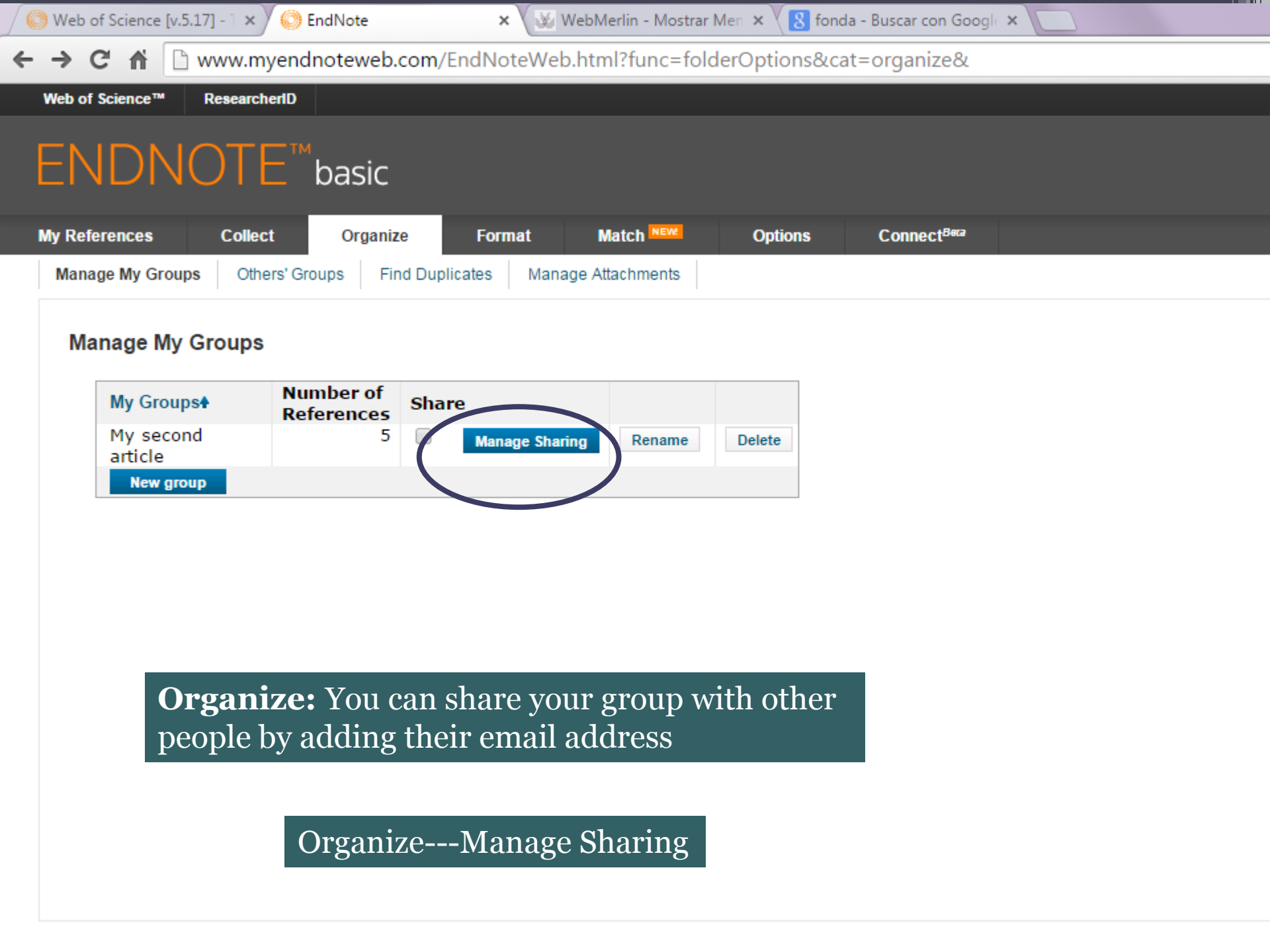
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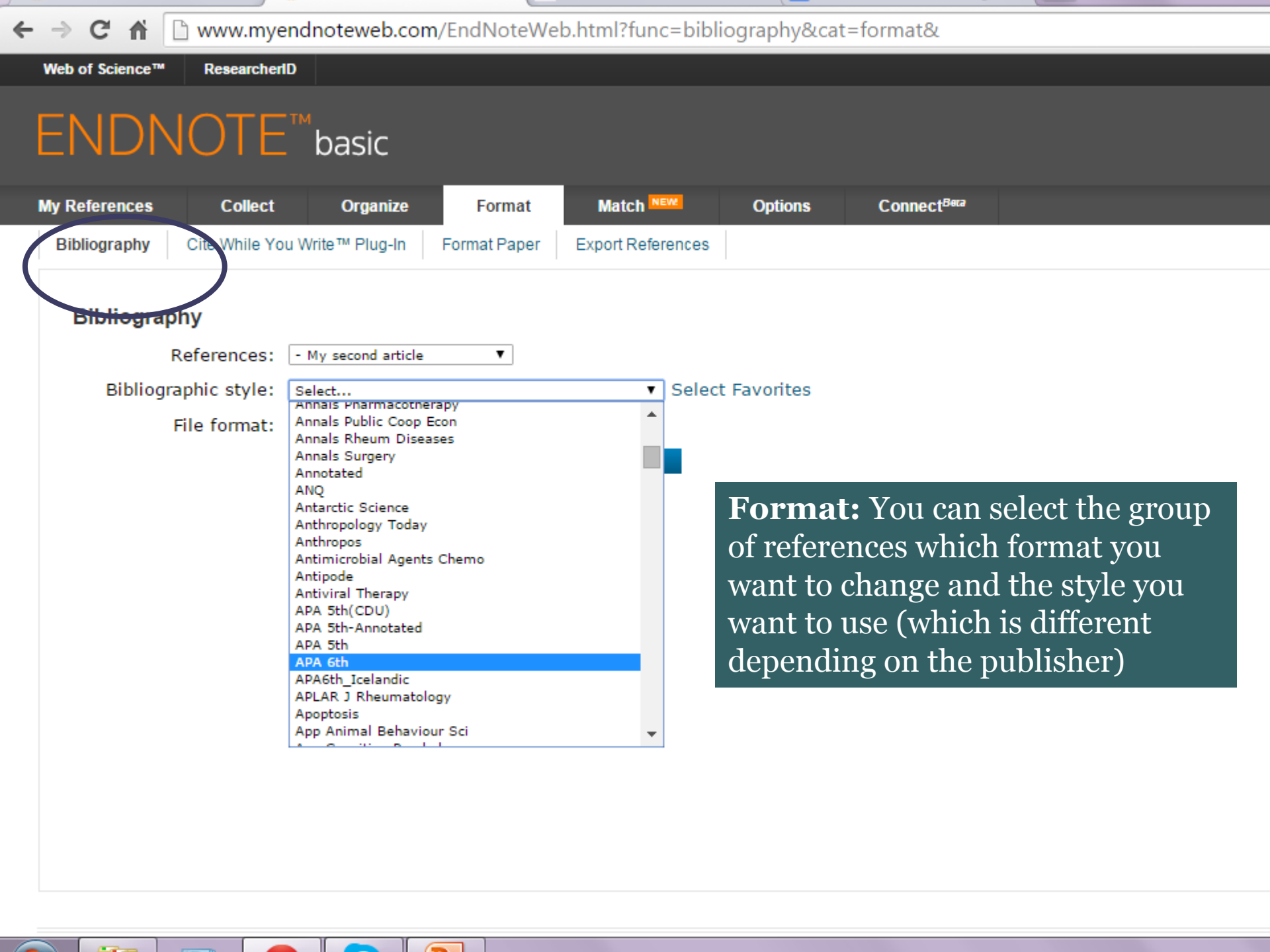
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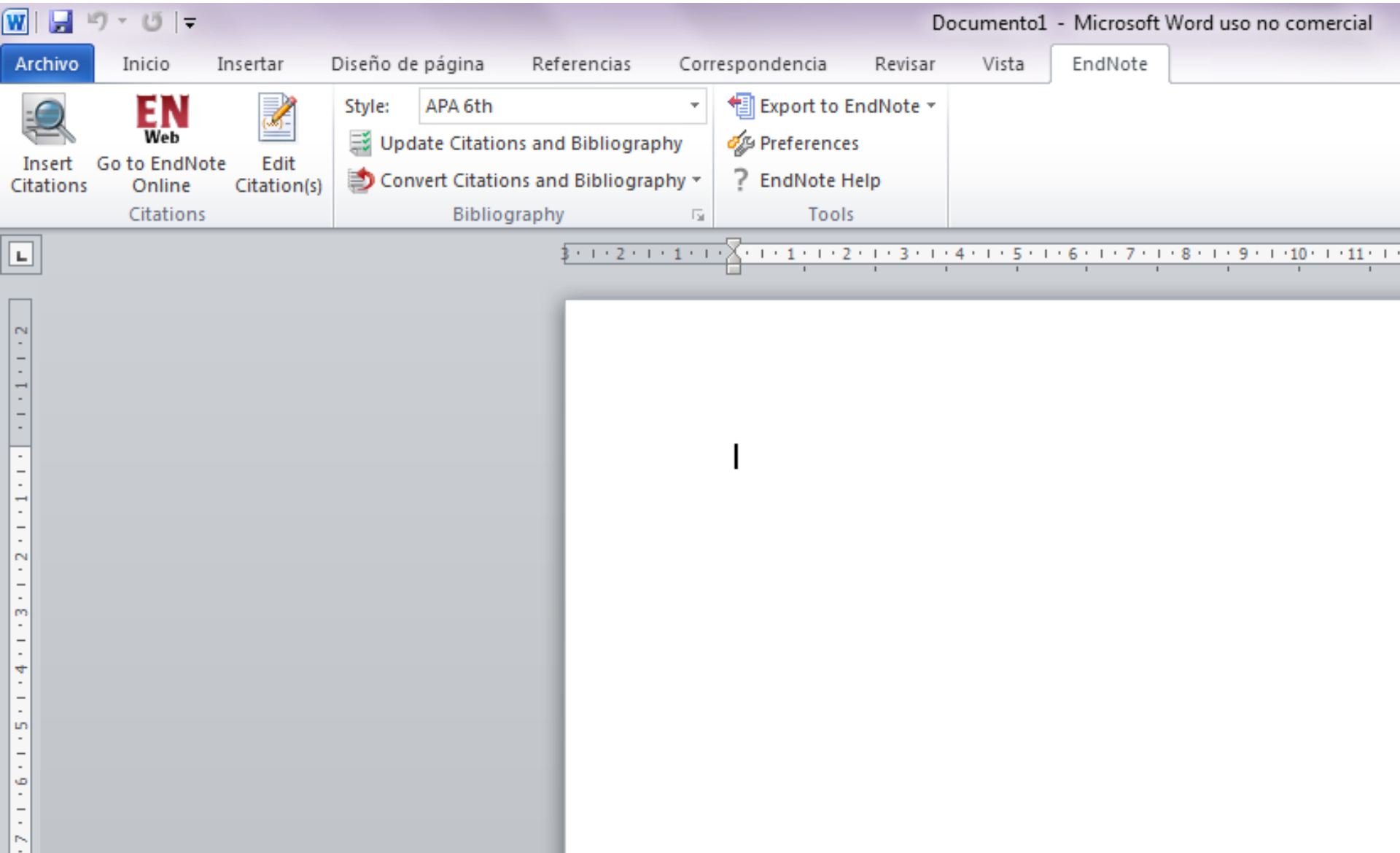

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Literature searches

- Practical case:

Choose a topic about which you will be or would like to be researching in the near future.

Now, look for a scientific paper that you find interesting using those databases studied.

Index

- Getting started at the lab: **Literature searches**
- **Experimental work**: The day a day protocol
- Obtaining and gathering results:
  Writing a scientific paper
- **Make your scientific work visible:**
  Poster elaboration

Day a day work in a lab

Never forget,…

1) Keep a diary of your daily work: EVERYTHING you did and did wrong

2) Take pictures of the important things

Never forget,…

3) Keep everything tidy
(cleaning is vital: Protocols)

4) Never leave a bottle/beaker, etc. without the proper label

Index

- Getting started at the lab: **Literature searches**
- **Experimental work**: The day a day protocol
- Obtaining and gathering results:
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Writing a scientific paper

Writing a scientific paper

Main parts of a scientific paper

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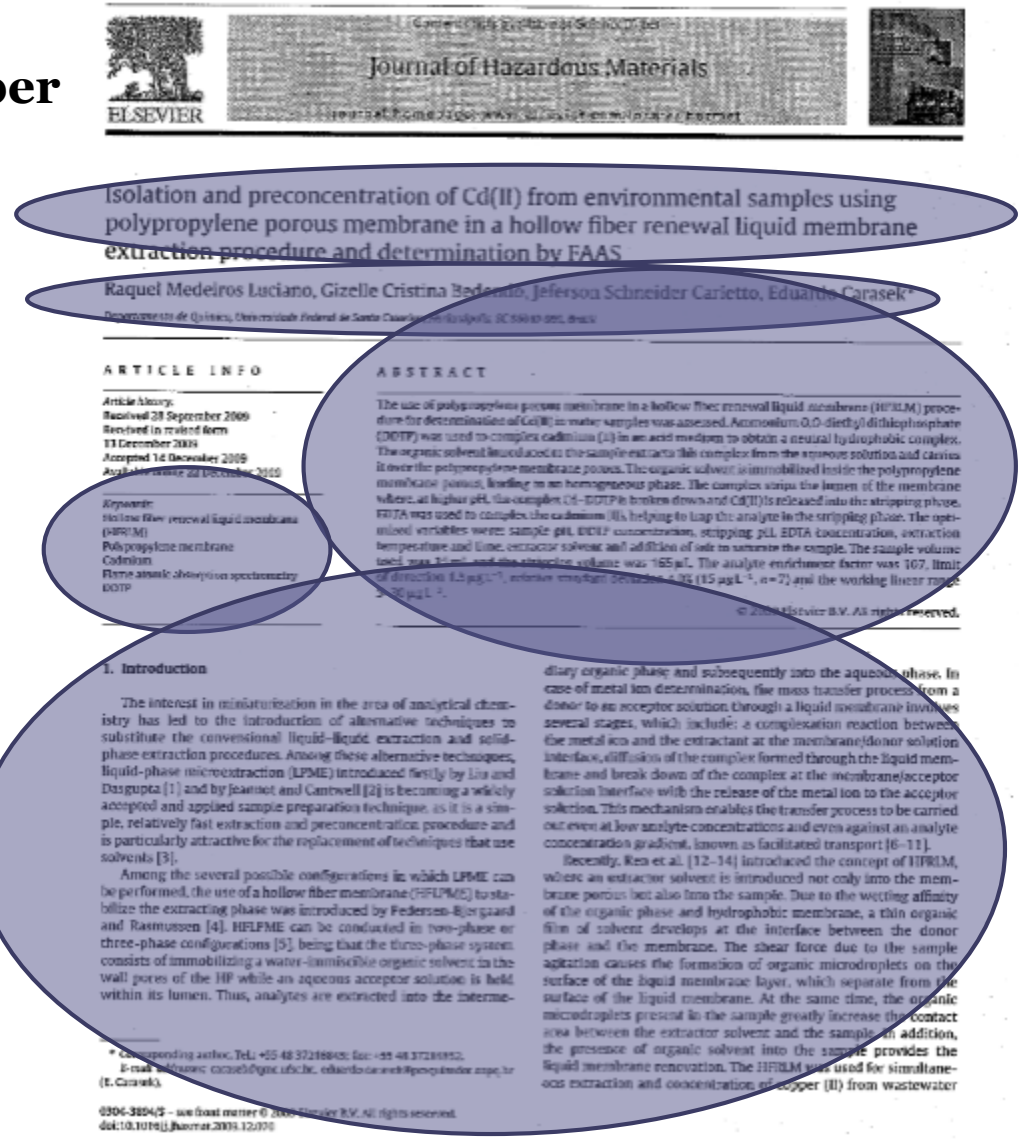
Authors

Abstract

Key words

Introduction



Journal of Hazardous Materials

Isolation and preconcentration of Cd(II) from environmental samples using polypropylene porous membrane in a hollow fiber renewal liquid membrane extraction procedure and determination by FAAS

Raquel Medeiros Luciano, Gizelle Cristina Bedendo, Jeferson Schneider Carletto, Eduardo Carasek*

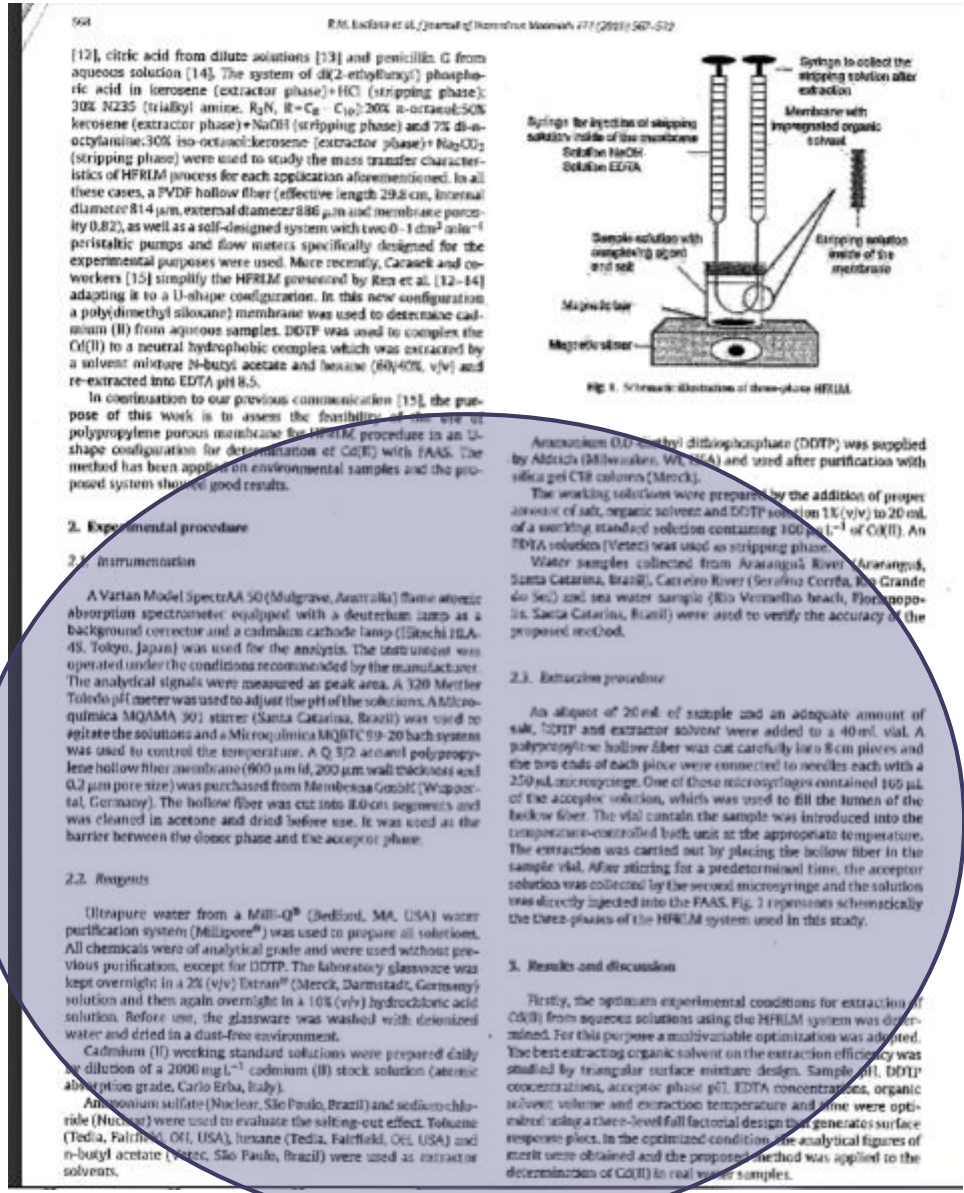
ARTICLE INFO

ABSTRACT

1. Introduction

Writing a scientific paper

Experimental procedure (instrumentation, reagents,...)



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[12], citric acid from dilute solutions [13] and penicillin G from aqueous solution [14]. The system of di(2-ethylhexyl) phosphoric acid in kerosene (extractor phase)+HCl (stripping phase); 30% N235 (trialkyl amine, R_3N, R=C_8 – C_{10}):20% n-octanol:50% kerosene (extractor phase)+NaOH (stripping phase) and 7% di-n-octylamine:30% iso-octanol:kerosene (extractor phase)+Na_2CO_3 (stripping phase) were used to study the mass transfer characteristics of HFRLM process for each application aforementioned. In all these cases, a PVDF hollow fiber (effective length 29.8 cm, internal diameter 814 μm, external diameter 886 μm and membrane porosity 0.82), as well as a self-designed system with two 0–1 $dm^3 min^{-1}$ peristaltic pumps and flow meters specifically designed for the experimental purposes were used. More recently, Carasek and coworkers [15] simplify the HFRLM presented by Ren et al. [12–14] adapting it to a U-shape configuration. In this new configuration a poly(dimethyl siloxane) membrane was used to determine cadmium (II) from aqueous samples. DDTP was used to complex the Cd(II) to a neutral hydrophobic complex which was extracted by a solvent mixture *n*-butyl acetate and hexane (60/40%, v/v) and re-extracted into EDTA pH 8.5.

In continuation to our previous communication [15], the purpose of this work is to assess the feasibility of the use of polypropylene porous membrane for HFRLM procedure in an U-shape configuration for determination of Cd(II) with FAAS. The method has been applied in environmental samples and the proposed system showed good results.

2. Experimental procedure

2.1. Instrumentation

A Varian Model SpectrAA 50 (Mulgrave, Australia) flame atomic absorption spectrometer equipped with a deuterium lamp as a background corrector and a cadmium cathode lamp (Hitachi HLA-4S, Tokyo, Japan) was used for the analysis. The instrument was operated under the conditions recommended by the manufacturer. The analytical signals were measured as peak area. A 320 Mettler Toledo pH meter was used to adjust the pH of the solutions. A Microquímica MQAMA 301 stirrer (Santa Catarina, Brazil) was used to agitate the solutions and a Microquímica MQBTC 99-20 bath system was used to control the temperature. A Q 3/2 accurel polypropylene hollow fiber membrane (600 μm id, 200 μm wall thickness and 0.2 μm pore size) was purchased from Membrana GmbH (Wuppertal, Germany). The hollow fiber was cut into 8.0-cm segments and was cleaned in acetone and dried before use. It was used as the barrier between the donor phase and the acceptor phase.

2.2. Reagents

Ultrapure water from a Milli-Q® (Bedford, MA, USA) water purification system (Millipore®) was used to prepare all solutions. All chemicals were of analytical grade and were used without previous purification, except for DDTP. The laboratory glassware was kept overnight in a 2% (v/v) Extran® (Merck, Darmstadt, Germany) solution and then again overnight in a 10% (v/v) hydrochloric acid solution. Before use, the glassware was washed with deionized water and dried in a dust-free environment.

Cadmium (II) working standard solutions were prepared daily by dilution of a 2000 mg L^{-1} cadmium (II) stock solution (atomic absorption grade, Carlo Erba, Italy).

Ammonium sulfate (Nuclear, São Paulo, Brazil) and sodium chloride (Nuclear) were used to evaluate the salting-out effect. Toluene (Tedia, Fairfield, OH, USA), hexane (Tedia, Fairfield, OH, USA) and *n*-butyl acetate (Vetec, São Paulo, Brazil) were used as extractor solvents.

Fig. 1. Schematic illustration of three-phase HFRLM.

Ammonium O,O′-diethyl dithiophosphate (DDTP) was supplied by Aldrich (Milwaukee, WI, USA) and used after purification with silica gel C18 columns (Merck).

The working solutions were prepared by the addition of proper amount of salt, organic solvent and DDTP solution 1% (v/v) to 20 mL of a working standard solution containing 100 μg L^{-1} of Cd(II). An EDTA solution (Vetec) was used as stripping phase.

Water samples collected from Araranguá River (Araranguá, Santa Catarina, Brazil), Carvoeiro River (Serafina Corrêa, Rio Grande do Sul) and sea water sample (Rio Vermelho beach, Florianopolis, Santa Catarina, Brazil) were used to verify the accuracy of the proposed method.

2.3. Extraction procedure

An aliquot of 20 mL of sample and an adequate amount of salt, DDTP and extractor solvent were added to a 40 mL vial. A polypropylene hollow fiber was cut carefully into 8 cm pieces and the two ends of each piece were connected to needles each with a 250 μL microsyringe. One of these microsyringes contained 105 μL of the acceptor solution, which was used to fill the lumen of the hollow fiber. The vial contain the sample was introduced into the temperature-controlled bath unit at the appropriate temperature. The extraction was carried out by placing the hollow fiber in the sample vial. After stirring for a predetermined time, the acceptor solution was collected by the second microsyringe and the solution was directly injected into the FAAS. Fig. 1 represents schematically the three-phases of the HFRLM system used in this study.

3. Results and discussion

Firstly, the optimum experimental conditions for extraction of Cd(II) from aqueous solutions using the HFRLM system was determined. For this purpose a multivariable optimization was adopted. The best extracting organic solvent on the extraction efficiency was studied by triangular surface mixture design. Sample pH, DDTP concentrations, acceptor phase pH, EDTA concentrations, organic solvent volume and extraction temperature and time were optimized using a three-level full factorial design that generates surface response plots. In the optimized condition, the analytical figures of merit were obtained and the proposed method was applied to the determination of Cd(II) in real water samples.

Writing a scientific paper

Results and discussion

3.1. *Effect of salting-out*

The addition of salts to the samples results in increase of the ionic strength of the solution influencing significantly the extraction process. In some cases, an increase in the ionic strength of the sample phase can decrease the solubility of the analytes in an aqueous medium because of the effect called salting-out [16]. In this process, the water molecules hydrate ions reducing the molecules of analytes dissolved in the aqueous medium through a competition mechanism. In other words, increasing the salt concentration in the donator phase the water molecules will have more interaction to salt ions, releasing the DDTP–Cd(II) complex to interact to the organic solvent.

In order to evaluate the salting-out effect, some preliminary experiments using sodium chloride and ammonium sulfate were carried out. The results have shown that both salts presented an improvement in the extraction efficiency. However, a saturated ammonium sulfate solution showed a very distinct improvement in the analytical signal as demonstrated previously in our recent work [15]. The possible explanation is the high solubility and the presence of double charge in the ammonium sulfate which increase considerably the ionic strength of the solution. Despite the difference in ionic strength of feed aqueous solution and stripping solution, there was no osmotic process observed in the proposed system. Probably, because of the fact that the polypropylene membrane was completely filled with organic solvent which prevents permeability of the water molecules. Thus, this condition was adopted in the subsequent tests.

3.2. *Effect of extractor solvent*

An organic solvent suitable for the HFRLM should have low solubility in water, good compatibility with polypropylene hollow membrane and high partition coefficient between the analytes and the solvent [17]. In this case, the polarity between the organic solvent and the DDTP–Cd(II) complex should be similar, so a high partition coefficient could be reached. The effect of some extractor solvents on the extraction efficiency was studied. The mixture of organic solvents was optimized through triangular surface mixture design, where toluene, hexane and butyl acetate were evaluated individually, through binary mixtures with 33% and 67% (v/v) of one solvent and a ternary mixture containing 33% of each solvent. The results obtained from this design can be seen in Fig. 2. Here, there is a region in which the response reaches high values, corresponding to the use of toluene. This condition was selected to continue the optimization of the proposed method.

3.3. *Effect of sample pH and DDTP concentration*

Several factors were responsible for the choice of DDTP as complexing agent such as its solubility in water, high stability in acid medium and high formation constant to Cd(II) complexes [18]. The best experimental conditions for sample pH and DDTP concentration were determined through a three-level experimental design. From these results, a response surface was generated as shown in Fig. 3. Increasing the DDTP concentration from 0.025% to approximately 0.07% we can see an enhancement in the analytical signal. This indicates that with a DDTP concentration below 0.025% the extracting solvent does not contain enough DDTP to complex Cd(II), reducing the Cd(II) flux through the membrane. On the other hand, high DDTP concentrations lead to an increased membrane viscosity and, consequently, a lower extraction efficiency due to a reduced Cd(II) flux through the membrane. Also, high DDTP concentrations can lead to the formation of charged complexes like ML_3^- (where M is the metal ion and L is the DDTP ligand). Thus, the amount of the

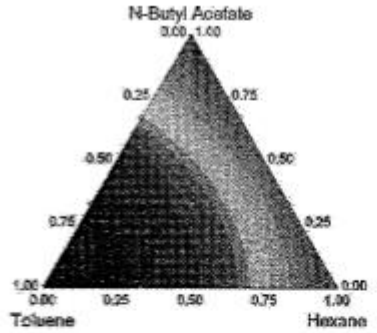

Fig. 2. Study of the effect of solvent choice on Cd(II) extraction by HFRLM with polypropylene membrane and detection by FAAS. Experimental conditions: 100 μg L^{-1} Cd(II), extraction time 30 min, sample pH 3.5, DDTP concentration 0.01% (m/v), stripping pH 8.5, EDTA concentration 5×10^{-3} mol L^{-1}, saturated solution $(NH_4)_2SO_4$ and extracting solvent volume: 300 μL.

eventually extracted into the organic solvent. Fig. 3 also shows an antagonistic effect between the sample pH and the DDTP concentrations. As can be observed, reducing the sample pH a higher DDTP concentration is required for the complexation of Cd(II), probably because the protonation of DDTP is increased. In accordance with this study the optimum values for the two variables are sample pH of 3.5 and DDTP concentration of 0.055% (m/v).

3.4. *Effect of acceptor phase pH and EDTA concentration*

As in the three-phase HFRLM system the DDTP–Cd(II) complex is formed in an acid medium, the pH acceptor phase should be basic promoting the broken down of the complex and releas-

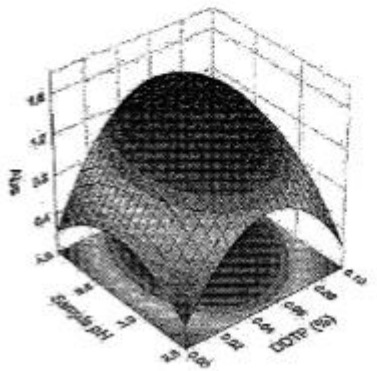

Fig. 3. Study of effect of sample pH and DDTP concentration on Cd(II) extraction by HFRLM with polypropylene membrane and detection by FAAS. Experimental conditions: 100 μg L^{-1} Cd(II), extraction time 30 min, stripping pH 8.5, EDTA concentration 5×10^{-3} mol L^{-1}, saturated solution $(NH_4)_2SO_4$ and extraction solvent

Writing a scientific paper

Conclusions

Acknowledgments

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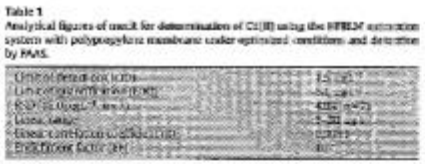


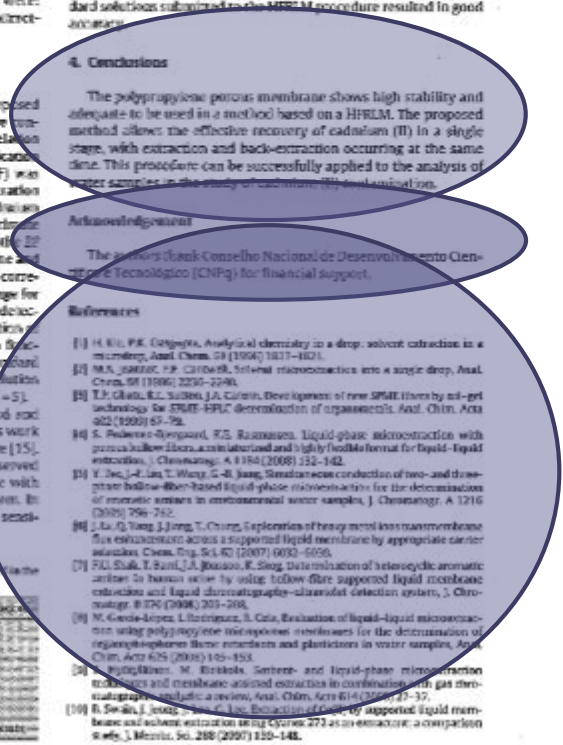
probably due to an increase in the analyte diffusion through the membrane. However, a higher extraction temperature is not appropriate because of the exothermic effect of the membrane extraction process. The extraction temperature also directly affects the solvent solubility in the sample, leading to degradation of the liquid membrane in HFSEM. Fig. 5B indicates that the undesirable membrane degradation effect can be overcome by adding a higher volume of extracting solvent to the sample. Thus, in the case of the HFRLM technique, the degradation of the liquid membrane does not occur because of the excess of extracting solvent in the sample, which renews the liquid membrane through the extraction period. The optimized extraction conditions used to continue this study were: extraction temperature 36 °C, extraction time 36 min and extracting solvent volume 310 μL.

3.6. *Analytical figures of merit and accuracy*

The analytical data of interest for the optimized proposed method are summarized in Table 1. Calibration curves were constructed to estimate the sensitivity, enrichment factor, correlation coefficients, limit of detection (LOD) and limit of quantification (LOQ) of the proposed method. The enrichment factor (EF) was calculated through the ratio between the slope of a calibration curve with and without preconcentration. The amount of cadmium extracted in the optimum experimental conditions can be estimated through the EF. In case of all analytes have been extracted, the EF should be 121 (calculated by ratio between the sample volume and stripping volume). As it was obtained an EF of 107, this value corresponds to 88% of cadmium extracted. The working linear range for the optimized procedure was between 5 and 30 μg L^{-1}. The detection limit was calculated as three times the standard deviation of ten blank readings divided by the slope of the calibration function. The method precision of 4.0% assessed as relative standard deviation was determined by submitting 20 mL of sample solution containing 15 μg L^{-1} of Cd(II) to the optimized procedure ($n = 5$).

A comparison between the LOD of the proposed method and several others found in the literature, including our previous work in which was used a PDMS membrane in a HFRLM technique [15], for determination of Cd(II) is presented in Table 2. It can be observed that the detection limit obtained in this study is comparable with that of other studies which used AAS as the detection system. In addition, the HFRLM technique is competitive in terms of sensitivity when compared with widely employed sample preparation techniques, such as solid-phase extraction (SPE) and cloud point extraction (CPE).

To verify the accuracy of the proposed procedure recovery tests were carried out using water samples from the Araranguá River (Araranguá, Santa Catarina, Brazil), Carneiro River (Serafina Corrêa, Rio Grande do Sul, Brazil) and seawater from Moçambique Beach (Florianópolis, Santa Catarina, Brazil). In all samples the analyte concentration was below the limit of detection of the method. In order to evaluate the accuracy of the preconcentration procedure, recovery experiments were carried out with spiked water samples (15 μg L^{-1}). As shown by the results in Table 3, good agreement between spiked and found values was obtained at a 95% confidence level, indicating that the calibration carried out using aqueous standard solutions submitted to the HFRLM procedure resulted in good accuracy.



4. Conclusions

The polypropylene porous membrane shows high stability and adequate to be used in a method based on a HFRLM. The proposed method allows the effective recovery of cadmium (II) in a single stage, with extraction and back-extraction occurring at the same time. This procedure can be successfully applied to the analysis of [illegible]

Acknowledgment

The authors thank Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for financial support.

References

[1] H. Kiz, P.K. Dasgupta, Analytical chemistry in a drop: solvent extraction in a microdrop, Anal. Chem. 59 (1996) 1817–1821.

[2] M.A. Jeannot, F.F. Cantwell, Solvent microextraction into a single drop, Anal. Chem. 68 (1996) 2236–2240.

[3] T.P. Glass, R.L. Sutton, J.A. Cotruvo, Development of new SPME fibers by sol–gel technology for SPME-HPLC determination of organometals, Anal. Chim. Acta 402 (1999) 65–78.

[4] S. Pedersen-Bjergaard, K.E. Rasmussen, Liquid-phase microextraction with porous hollow fibers, a miniaturized and highly flexible format for liquid–liquid extraction, J. Chromatogr. A 1184 (2008) 132–142.

[5] Y. Dai, J.-F. Liu, T. Wang, G.-B. Jiang, Simultaneous conduction of two- and three-phase hollow-fiber-based liquid-phase microextraction for the determination of aromatic amines in environmental water samples, J. Chromatogr. A 1216 (2009) 756–762.

[6] J. Lu, Q. Yang, J. Jiang, T. Chang, Exploration of heavy metal ions transmembrane flux enhancement across a supported liquid membrane by appropriate carrier selection, Chem. Eng. Sci. 62 (2007) 6083–6090.

[7] F.U. Shah, T. Kaur, J.A. Jönsson, K. Sieg, Determination of heterocyclic aromatic amines in human urine by using hollow fibre supported liquid membrane extraction and liquid chromatography–ultraviolet detection system, J. Chromatogr. B 876 (2008) 203–208.

[8] M. García-López, I. Rodríguez, S. Cela, Evaluation of liquid–liquid microextraction using polypropylene microporous membranes for the determination of organophosphorus flame retardants and plasticizers in water samples, Anal. Chim. Acta 625 (2008) 145–153.

[9] [illegible]

[10] B. Sevin, J. Jouan, [illegible]

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- Most important key words should be in the title.
- It must be powerful and with rhetoric strength.

Abstract

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Introduction

- Put your thesis/question somewhere near the end.
- Put some important background information directly before.
- It should inform of your paper's general topic, the type of terminology, evidence and logic they can expect throughout the paper.
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Results and discussion

- May be the most difficult to write.
- The results of the data analyses are presented (the length is set by the amount and types of data).
- They should be organized around a series of tables and/or figures.
- This section highlights the answers to the hypotheses you investigated.

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Conclusion

- It answers the questions posed in the introduction.
- It is considered *the heart of the paper* and usually requires several writing attempts.
- Try to organize your thoughts in a logical form.
- Should be as short as possible while clearly stating, supporting and explaining your answers and discussing other relevant issues.
- Explain how the results and conclusions of this study are important and how they influence our knowledge of the problem being examined.

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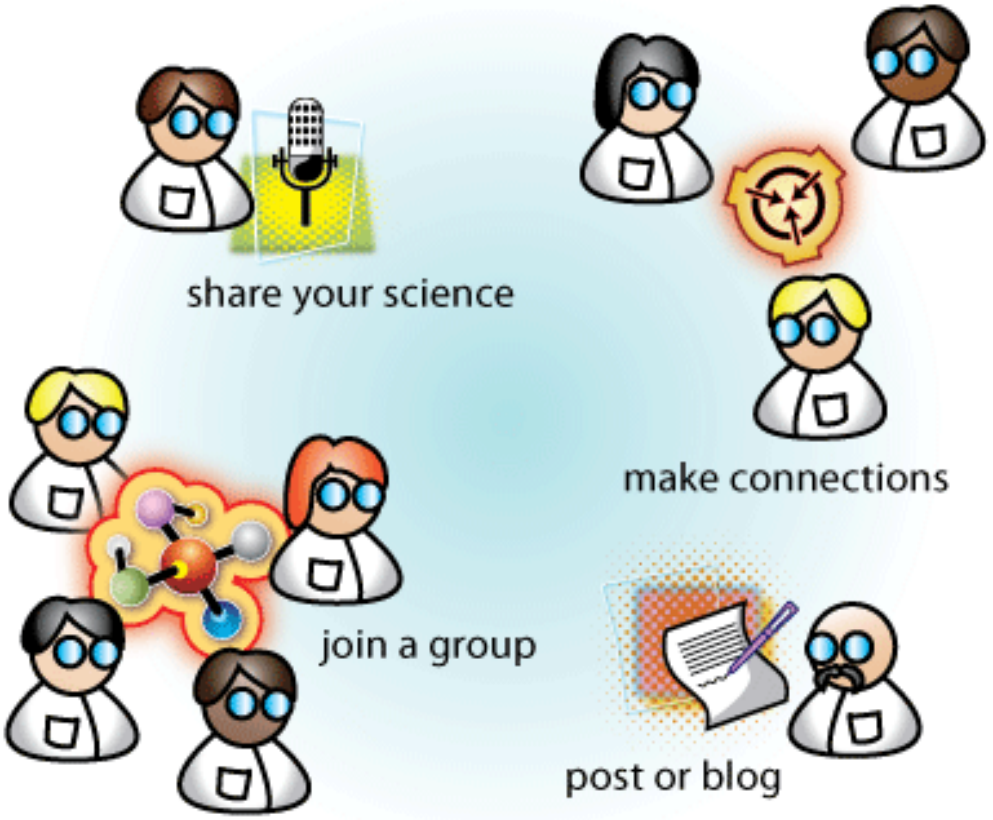

Make your scientific work visible

Presenting your work in a congress: Poster elaboration

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- Be creative.
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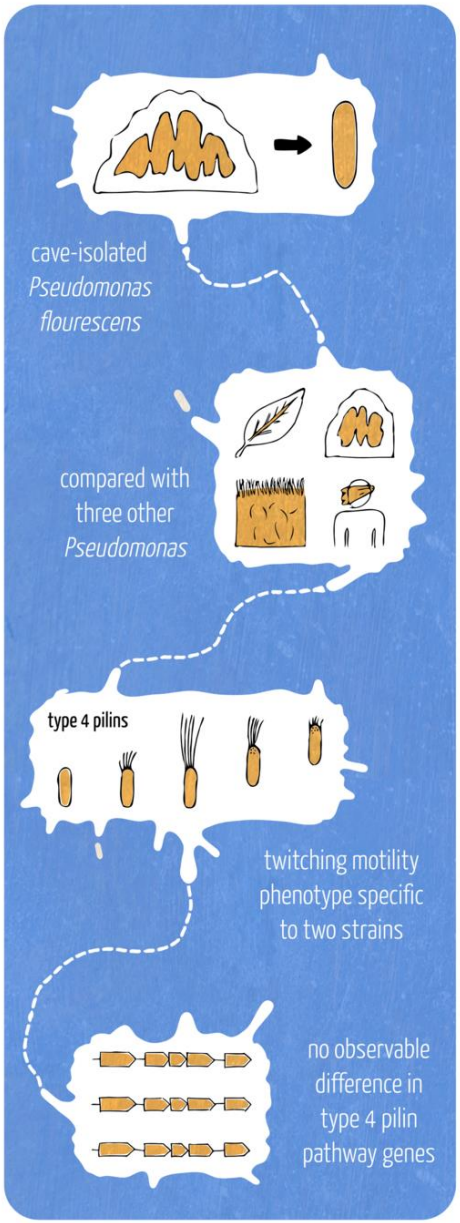

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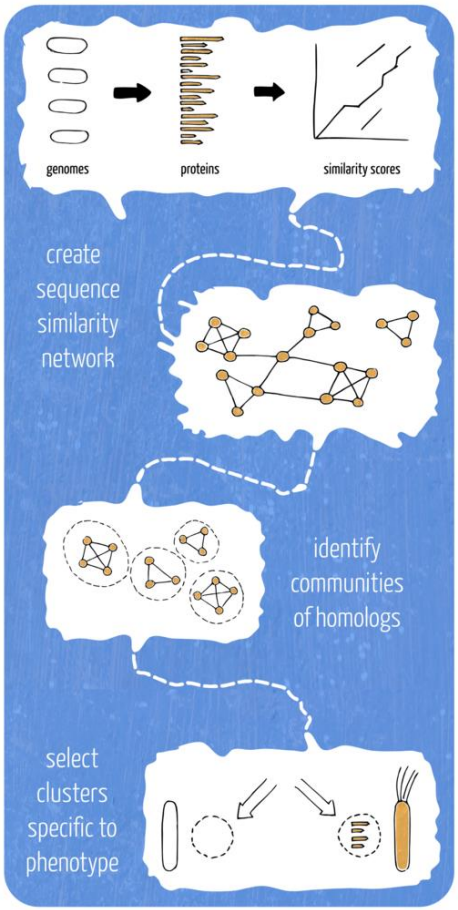

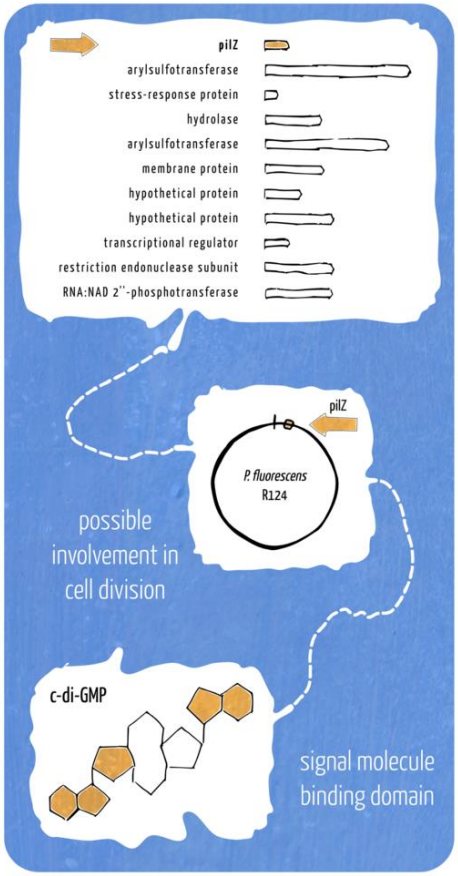

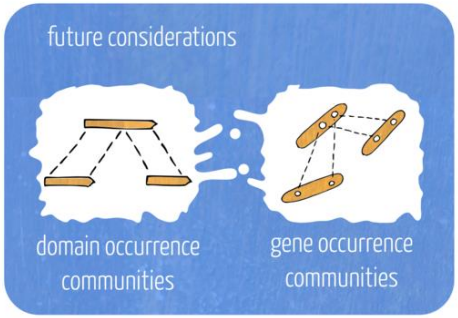

Presenting your work in a congress: Poster elaboration

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Importance of the research
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Theory of the system (basic)

Results

Conclusions

References (optional)

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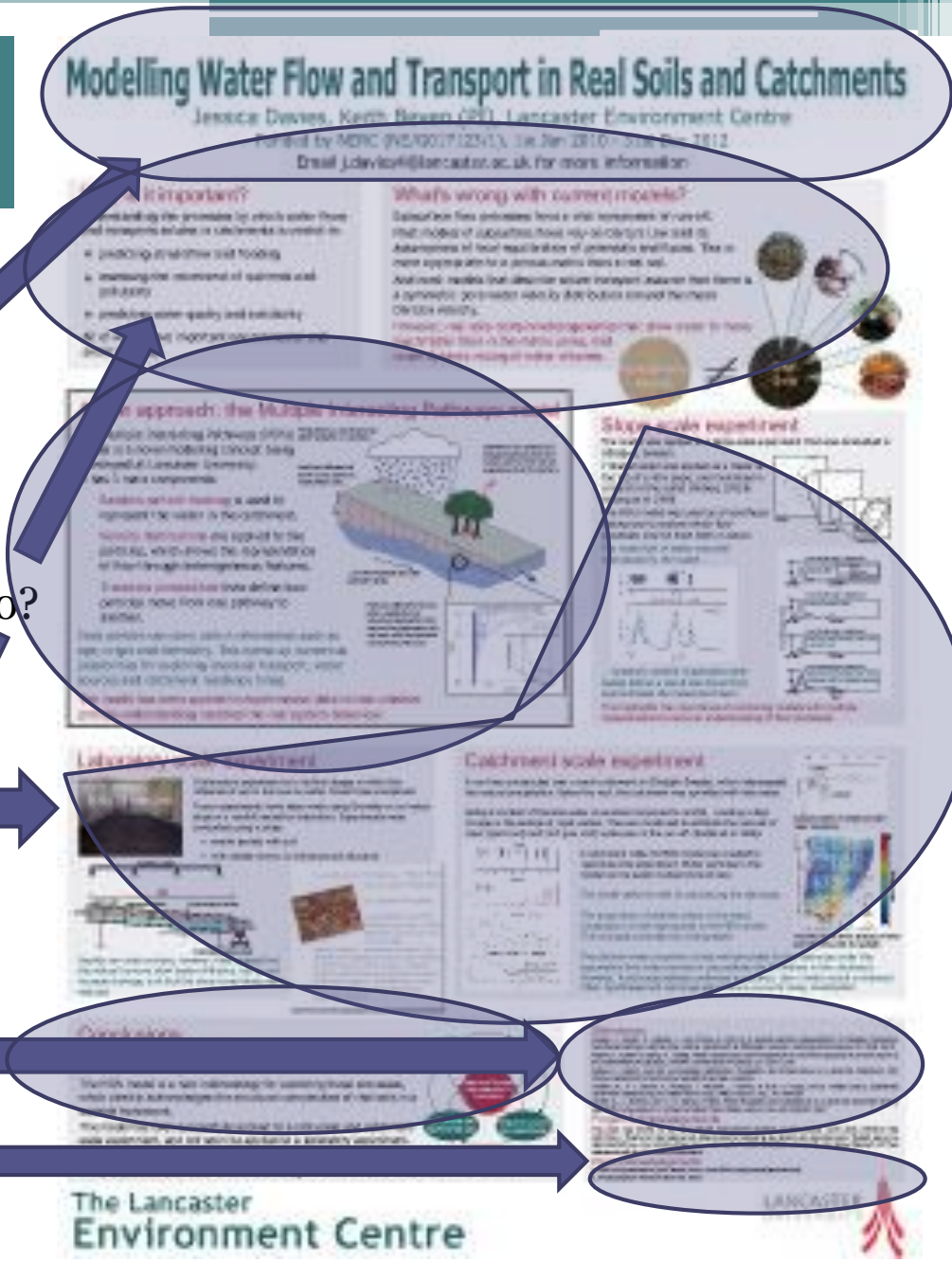

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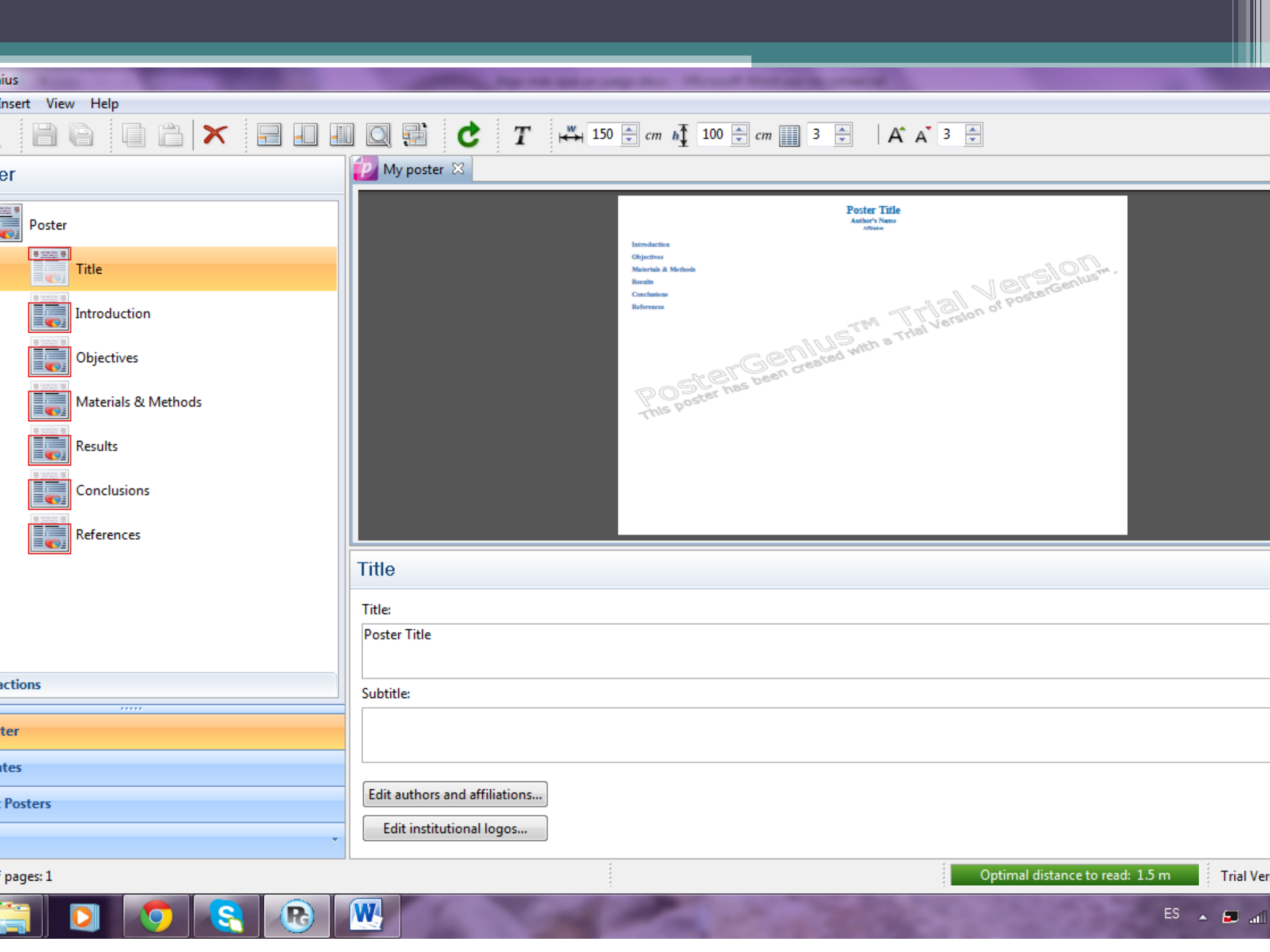
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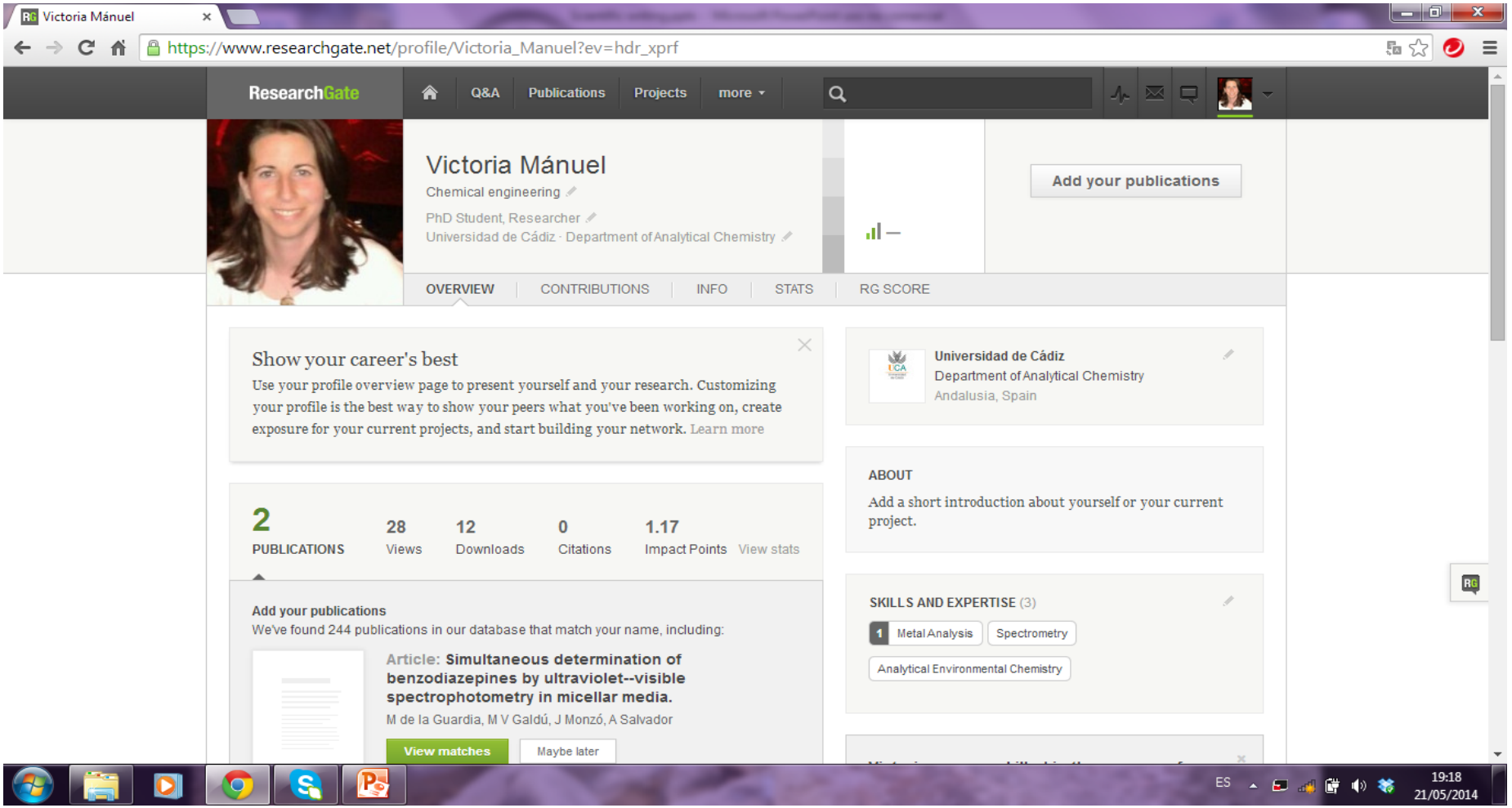

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